

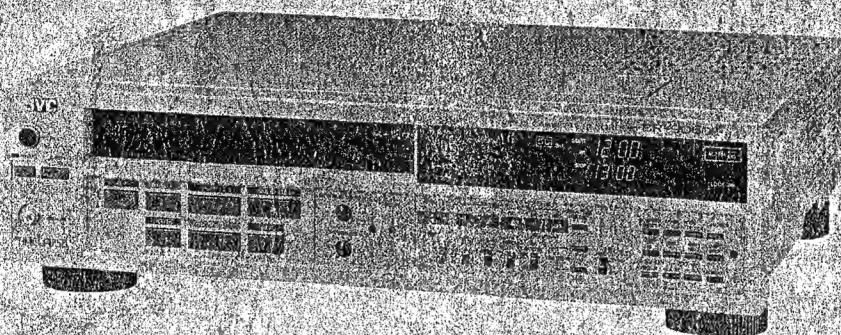
# JVC

## SERVICE MANUAL

### TIME LAPSE VIDEO CASSETTE RECORDER

[Revised Edition]

## RR-9060E



### SPECIFICATIONS

#### GENERAL

Recording system	Luminance — FM Chroma — Down-converted
Signal system	PAL/CCIR, 625 lines
Tape speed	23.39 mm/s (VHS SP) 11.70 mm/s (VHS LP)
Record/Play time	3, 6, 24, 72, 120, 240, 480 and 960 hours (with E-180 video cassette)
Operating temperature	5°C to 40°C
Operating humidity	35% to 80%
Storage temperature	-20°C to 60°C
Power requirement	220-240 V AC, 50/60 Hz
Power consumption	30 watts
Dimensions	435(W) x 124(H) x 370(D) mm

#### VIDEO

Input	0.5 to 2.0 Vp-p, 75 ohms, unbalanced, BNC
Output	1.0 Vp-p, 75 ohms, unbalanced, BNC
Horizontal resolution	Colour-240 lines (VHS SP) B/W-300 lines (VHS SP)
S/N ratio	More than 43 dB (VHS SP)

#### AUDIO

Number of tracks	1
Input	-8 dBs, RCA
Output	-6 dBs, RCA
S/N ratio	40 dB (at 3% distortion)

#### TIME/DATE GENERATOR

Display	Day, month, year, hours, minutes, seconds, Recording mode
Character size	16H
Power backup	Approx. one year

#### ALARM

Alarm input	Ground input
Alarm output	Alarm input through-out
Camera switching output	Negative pulse output (approx. 5 ms), BNC

#### SERIES RECORDING

Series input	Ground input, RCA
Series output	Series input through-out, RCA
Accessories	"R6" batteries x 5 Remote control unit x 1 Switch cover x 1 Lock key x 2

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# Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

## ● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (■) parts are critical for safety.  
Replace only with specified part numbers.  
**Note:** Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.  
Caution for continued protection against fire hazard.  
Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:  
1) Wires covered with PVC tubing  
2) Double insulated wires  
3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:  
1) Insulation Tape      3) Spacers      5) Barrier  
2) PVC tubing      4) Insulation sheets for transistors

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

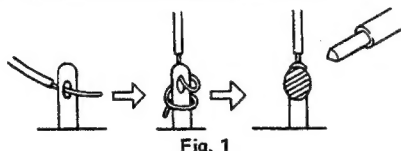


Fig. 1

7. Observe that wires do not contact heat producing parts (heat-sinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.

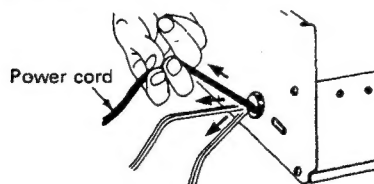


Fig. 2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)  
In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

## 12. Crimp type wire connector

In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

1) **Connector part number** : E03830-001

2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.

3) **Replacement procedure**

(1) Remove the old connector by cutting the wires at a point close to the connector.

Important : Do not reuse a connector (discard it).



Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

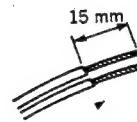


Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

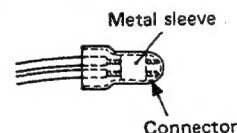


Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

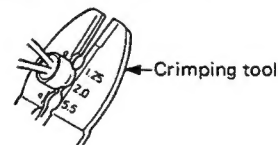


Fig. 6

(5) Check the four points noted in Fig. 7.

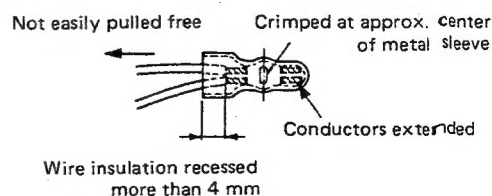


Fig. 7



## ● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

### 1. Insulation resistance test

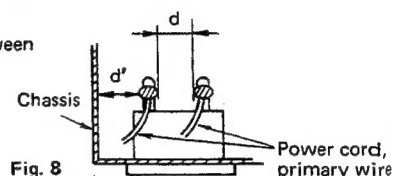
Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

### 2. Dielectric strength test

Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

### 3. Clearance distance

When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

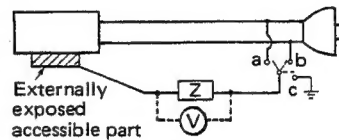


### 4. Leakage current test

Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

**Measuring Method:** (Power ON)

Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

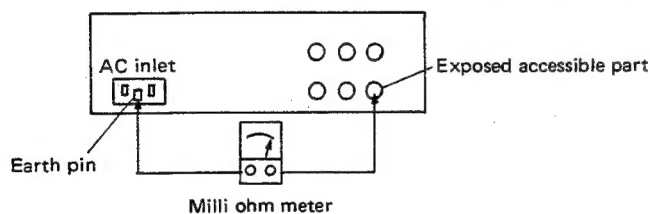


### 5. Grounding (Class I model only)

Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).

**Measuring Method:**

Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.



#### Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	$Z \leq 0.1 \text{ ohm}$
Europe & Australia	$Z \leq 0.5 \text{ ohm}$

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	$R \geq 1 \text{ M}\Omega / 500 \text{ V DC}$	AC 1 kV 1 minute	$d, d' \geq 3 \text{ mm}$
100 to 240 V			AC 1.5 kV 1 minute	$d, d' \geq 4 \text{ mm}$
110 to 130 V	USA & Canada	—	AC 900 V 1 minute	$d, d' \geq 3.2 \text{ mm}$
110 to 130 V	Europe & Australia	$R \geq 10 \text{ M}\Omega / 500 \text{ V DC}$	AC 3 kV 1 minute (Class II)	$d \geq 4 \text{ mm}$
200 to 240 V			AC 1.5 kV 1 minute (Class I)	$d' \geq 8 \text{ mm (Power cord)}$ $d' \geq 6 \text{ mm (Primary wire)}$

Table 1 Specifications for each region

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	$1 \text{ k}\Omega$	$i \leq 1 \text{ mA rms}$	Exposed accessible parts
110 to 130 V	USA & Canada	$0.15 \mu\text{F}$ and $1.5 \text{ k}\Omega$	$i \leq 0.5 \text{ mA rms}$	Exposed accessible parts
110 to 130 V	Europe & Australia	$2 \text{ k}\Omega$	$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Antenna earth terminals
220 to 240 V		$50 \text{ k}\Omega$	$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Other terminals

Table 2 Leakage current specifications for each region

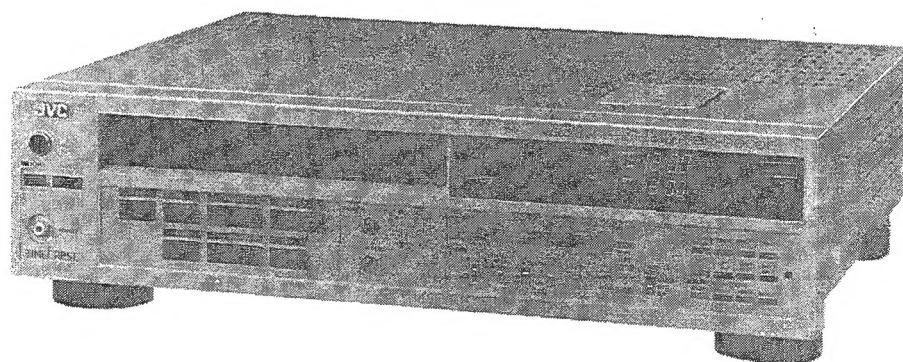
Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

# INSTRUCTIONS

# JVC

# BR-9060E

## TIME LAPSE VIDEO CASSETTE RECORDER



### Warning Notice

#### FOR YOUR SAFETY (Australia)

1. Insert this plug only into effectively earthed three-pin power outlet.
2. If any doubt exists regarding the earthing, consult a qualified electrician.
3. Extension cord, if used, must be three-core correctly wired.

### POWER SYSTEM

#### Connection to the mains supply

This set operates on 220 to 240V~, 50/60 Hz.

This unit is produced to comply with Directives 76/889/EEC, 92/499/EEC and 87/308/EEC.

### WARNING:

**TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.**

### CAUTION

To prevent electric shock, do not open the cabinet. No user serviceable parts inside. Refer servicing to qualified service personnel.

**Note:** The rating plate and the safety caution are on the rear of the unit.

### IMPORTANT (In the United Kingdom)

#### Mains Supply (AC 240 V~)

**WARNING — THIS APPARATUS MUST BE EARTHED**

The wires in this mains lead are coloured in accordance with the following code;

GREEN-and-YELLOW: EARTH  
BLUE: NEUTRAL  
BROWN: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows. The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked with the letter E or by the safety earth symbol  $\perp$  or coloured GREEN or GREEN-AND-YELLOW. The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or which is coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

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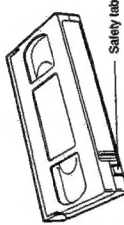
## PRECAUTIONS

### Handling and storage

- Avoid using the recorder under the following conditions:
  - extremely hot, cold or humid places.
  - dusty places.
  - near appliances generating strong magnetic fields,
  - places subject to vibrations, and
  - poorly ventilated places.
- Be careful of moisture condensation. Avoid using the recorder immediately after moving from a cold place to a warm place. The water vapor in warm air will condense on the still-cold video head drum and tape guides and may cause damage to the tape and the recorder.
- Handle the recorder carefully.
  - Do not block the ventilation openings.
  - Do not place anything heavy on the recorder.
  - Do not place anything which might spill and cause trouble on the top cover of the recorder.
  - Use in horizontal (flat) position only.
  - In case of transportation.
  - Avoid violent shocks to the recorder during packing and transportation.
  - Before packing, be sure to remove the cassette from the recorder.

### Video cassettes

- Video cassettes are equipped with a safety tab to prevent accidental erasure. When the tab is removed, recording cannot be performed.



Safety tab

- Avoid exposing the cassette to direct sunlight. Keep them away from heaters.
- Avoid extreme humidity, violent vibrations or shocks, strong magnetic fields (near a motor, broadcasting antenna, wireless transmitter, transformer or magnet) and dusty places.
- Place the cassettes in cassette cases and position vertically.
- Do not use longer tapes than the E-180 Video Cassette with the BR-9060E.

### Moisture condensation

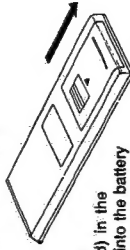
- If you pour a cold liquid into a glass, water vapor in the air will condense on the surface of the glass. This is called moisture condensation.
- Moisture condensation on the head drum, one of the most crucial parts of the video recorder, will cause damage to the tape.
- Moisture in the air will condense on the recorder when you move it from a cold place to a warm place, or under extremely humid conditions.

### Operation

- When a cassette is loaded, the power is switched on and, if the safety tab has been removed, playback begins automatically.
- The cassette can be unloaded even when the power is off. Pressing the EJECT button turns the power on and, after ejection of the cassette, shuts it off automatically in this case.
- As long as the TIMER button is engaged with the TIMER indicator lit, the POWER and EJECT buttons have no effect and unloading of a cassette is not possible. If a cassette has not yet been inserted, simply insert a cassette; the power will be switched on to load the cassette properly and, after completion of automatic loading, the Timer Recording Standby mode will be engaged with power off.
- The batteries installed in the top panel must be replaced once a year.

### Installing the batteries

1. Slide the battery compartment cover on the rear of the unit in the direction of the arrow (▶).
2. Insert 2 "AA"-size batteries (provided) in the correct directions into the battery compartment.
3. Replace the cover.



## AVAILABLE RECORDING OPTIONS ACCORDING TO THE SETTING OF THE REC MODE BUTTON

REC MODE switch setting	Recording time						Recording Interval	Audio recording	Playback Interval
	E-30	E-60	E-90	E-120	E-180				
VHS/SP	30 min	1 hour	1 h 30 min	2 hours	3 hours		—	—	
VHS/LP	1 hour	2 hours	3 hours	4 hours	6 hours		Yes	—	
TL/24	4 h 30 min	9 hours	12 hours	18 hours	24 hours	0.16 sec	No	0.32 sec	
TL/72	12 hours	24 hours	36 hours	54 hours	72 hours	0.48 sec		0.96 sec	
TL/120	20 hours	40 hours	60 hours	90 hours	120 hours	0.8 sec		1.6 sec	
TL/240	40 hours	80 hours	120 hours	180 hours	240 hours	1.6 sec		3.2 sec	
TL/480	80 hours	160 hours	240 hours	360 hours	480 hours	3.2 sec		6.4 sec	
TL/960	160 hours	320 hours	480 hours	720 hours	960 hours	6.4 sec		12.8 sec	



## FEATURES

### RECORDING FUNCTIONS

- 1 **MAXIMUM RECORDING TIME OF 960\* HOURS**  
In the time-lapse mode, recording times of 24, 72, 120, 240, 480 and 960 hours can be selected with an E-180 cassette. Recording times of 3 hours and 6 hours are possible in the SP (Standard Play) and LP (Long Play) modes. This choice allows a recording time suitable for any purpose to be selected, whether you're out for a few minutes or several days at a time.

\* Factory set to 480-hour mode.

Set DIP switch 7 on the rear panel to OFF.

### 2 ALARM RECORDING FUNCTION

When an alarm signal is input, the BR-9060E automatically switches from the time-lapse mode to the SP or LP mode to record the incident in greater detail, so that it can be seen clearly in playback. The alarm recording time is selectable between 15 sec, 180 sec, to the tape end, and while alarm pulses are being input, using a DIP switch on the rear panel.

### 3 TIMER RECORDING FUNCTION

The BR-9060E incorporates a 14-day/8-event timer that can be set to record for a predetermined time each day, each weekday (either Monday thru Friday or Monday thru Saturday) or each week.

The 8-event feature allows greater versatility in setting.

### 4 CANCEL PROGRAM

Timer recording can be cancelled for specific days; up to 14 days within one year can be specified.

### 5 CAMERA SWITCHING FUNCTION

The BR-9060E is designed for use with a sequential switcher and has a camera select signal output, so that camera switching is synchronized with the time-lapse recording intervals for continuous coverage.

The duration of the camera select signal output is selectable between 1 frame, 2 frames, 25 frames, and 50 frames, and the width of the pulse is 5 msec. This signal is output in the TL, SP, and LP recording modes.

### 6 TIME/DATE GENERATOR

The date (year, month, day), time (hour, minute, second) and recording mode when the recording was made can be superimposed on the screen.

The position of the display at the bottom right of the screen can be moved for improved visibility.

### 7 VIDEO MODE SELECTION

The BR-9060E incorporates a Colour/Auto/B & W video mode select switch.

The horizontal resolution is more than 300 lines (B/W mode).

### PLAYBACK FUNCTIONS

- 8 **SHUTTLE SEARCH**  
High-speed search in the forward and reverse directions is possible at 9x normal speed for recordings made in the SP, LP and time-lapse modes. 2X-1x search is also possible for all recordings.

### 9 STILL FRAME ADVANCE AND TL MODE PLAYBACK

These playback functions allow you to check any scene slowly and carefully.

### 10 ALARM SEARCH FUNCTION

A VISS (VHS Index Search System) code is recorded on the control track at the start of alarm recordings; these can be retrieved at high-speed even in the FF/REW mode to review any suspicious activities that triggered an alarm. Thanks to this function, the customers can trace the point of alarm recordings using the consumer model VHS deck which has a VISS capability at his home.

### SAFETY FUNCTIONS

#### 1 POWER FAILURE AUTO RESET

If there is a power failure during recording, when the power is restored, recording restarts in the same mode as before the power outage, automatically.

#### 2 NEWLY DEVELOPED HEAD CLEANING MECHANISM

For perfect picture, the heads are cleaned every time the tape is loaded and unloaded and at regular intervals in time-lapse modes.

#### 3 REPEAT FUNCTION

When the tape has been fully recorded, it is rewound and recording restarts from the beginning, to ensure that nothing is missed. A similar function makes playback more convenient.

#### 4 KEY LOCK FUNCTION

By operating the lock key, the function buttons are disabled and mistakes in operation are prevented. The green LED on the front panel will light in key lock mode.

#### 5 5000-HOUR HOUR METER

This helps schedule maintenance.

#### 6 TIME/DATE BACKUP

Even if there is a power failure, the time and date are backed up for about 1 year and do not need to be reset.

#### 7 TAPE-END BUZZER (Three minutes)

When the tape is about to finish, this warns the operator.

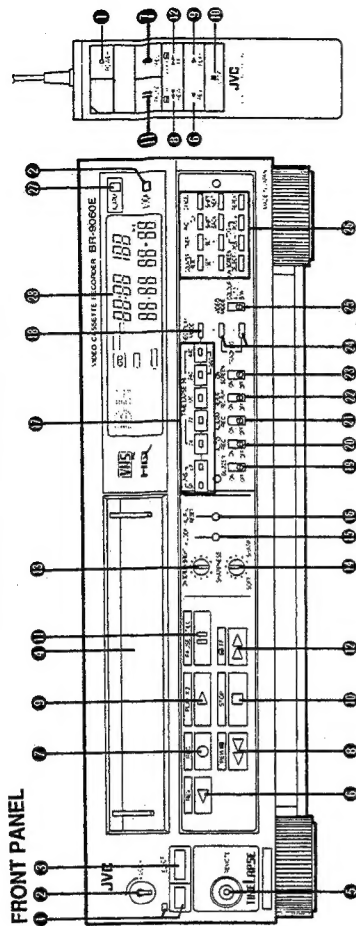
#### 8 ALARM/POWER LOSS MEMORY

The last alarm and power loss start time (YEAR/MONTH/DAY) will be memorized and indicated in the on-screen display.

#### 9 WIRED REMOTE CONTROL CAPABILITY

#### 10 SERIES RECORDING IN/OUT CONNECTORS

## CONTROLS AND CONNECTORS



#### 1 POWER button with LED indicator

Press to turn power on. The indicator will light. Loading a cassette also turns the power on.

#### 2 Key Lock with LED indicator

To lock: Insert the provided key into this key hole and turn it clockwise. The LOCK indicator will light and all buttons and switches except the following will be locked:

Front panel: Buzzer switch, Auto Rec switch, Repeat switch, On-Screen switch, and Video Mode switch.  
Rear panel: DIP switch in the compartment, and V-Pulse switch.

To unlock: Insert the provided key into the key hole and turn it counterclockwise. The LOCK indicator will turn off and all the locked buttons and switches will be released.

#### 3 EJECT button

Press to eject the cassette. This button can be pressed in any mode except the Timer mode. The cassette indicator on the FDP (fluorescent display panel) will flash while a cassette is being unloaded and then go out upon completion of unloading.

#### 4 Cassette loading slot

Insert a VHS cassette. The door will close and an indicator showing that a cassette has been loaded will appear on the FDP.

#### 5 REMOTE control terminal (RCA)

The provided remote control unit can be connected to this terminal.

#### 6 REV button

Press in the Play, Still or Search mode to play back a tape backwards.

#### 7 REC button

Press once to start recording; press again for instant timer recording. Each time it is pressed subsequently adds 30 minutes to the recording time, to a maximum of 9 hours. (See pages 9 and 15.) To start recording with the remote control unit, press the REC and PLAY buttons simultaneously. (The REC button of the remote control cannot be used for instant timer recording.)

#### 8 Rewind (REW) button

Press to rewind the tape in the cassette. While the tape is being rewound, the REW indicator on the FDP will light. This button can be pressed in any mode except Record, Eject or Timer. To release the Rewind mode, press the STOP or FF button, depending on which mode you want next. Pressing this button in the Play or Still mode enables high-speed playback at about 9 times normal in the reverse direction. During search, the REW indicator on the FDP will remain lit.

When the ALARM REC switch 10 on the front panel is set to ON, and this button is pressed in the Play or Stop mode, the tape enters the alarm search mode in the reverse direction. If the PLAY button is pressed within 2 seconds after pressing the REW button, the tape will be rewound to its start and playback will start automatically. (During rewind, the PLAY indicator on the FDP will blink.)

#### 9 PLAY/2 button

Press once to play a tape; press again for double-speed playback. To return to normal playback, press again. Also press this button to cancel the Pause/Still and Search modes. (See pages 10 and 11.)

#### 10 STOP button

To stop the tape. When the STOP button is pressed, the tape is unloaded and the Stop mode is engaged.

#### 11 PAUSE/STILL button

Press to temporarily stop the tape to avoid recording unwanted material or to view a still picture. The picture advances every time this button is pressed.

#### 12 Fast Forward (FF) button

Press to fast forward the tape in the cassette. While the tape is being fast forwarded, the FF indicator on the FDP will light. This button can be pressed in any mode except Record, Eject or Timer. To release the Fast Forward mode, press the PLAY, STOP or REW button, depending on the mode you want next. Pressing this button in the Play or Still mode enables high-speed playback at about 9 times normal, in the forward direction.

When the ALARM REC switch 10 on the front panel is set to ON, and this button is pressed in the Play mode, the tape enters the alarm search mode in the forward direction.

#### 13 ON SCREEN BRIGHT control

When time and date characters are superimposed on the picture, their brightness can be adjusted with this control by using a screwdriver. Turn clockwise for brighter characters and counterclockwise for darker characters.

#### 14 SHARPNESS control

Turn to adjust the video output signal delivered from the VIDEO OUT connector on the rear panel for a sharper or softer picture. Turn clockwise for a sharper picture and counterclockwise for a softer picture. Effective only for the playback picture.

#### 15 V-Lock control

In the Still mode, turn this to eliminate shaking of the picture.

#### 16 AL/PL RESET button

Pressing this resets the Alarm and Power Loss counter.

## REC mode indicators

These indicate the recording time and playback time (when using an E-180 cassette) selected with the REC/PLAY MODE button.

SP: SP mode

24: 24H mode

72: 72H mode

120: 120H mode

240: 240H mode

480: 480H mode

240: (960H mode)

480: (960H mode)

## REC/PLAY MODE select button

Select the tape speed in recording or playback

VHS SP : for the VHS SP mode.

VHS LP : for the VHS LP mode.

TL : for time lapse mode

24: for 24-hour mode

72: for 72-hour mode

120: for 120-hour mode

240: for 240-hour mode

480: for 480-hour mode

960: for 960-hour mode

## Buzzer ON/OFF switch

ON: The buzzer beeps 3 minutes before the tape reaches its end.

OFF: No buzzer operation. Also, set to OFF to stop the beeping buzzer.

Note: If the VTR is used for surveillance, this switch should be set to ON.

## AUTO REC switch

ON: Recording restarts automatically when power is restored after a power failure. Also use this position when recording with an external timer.

Note: Effective with cassettes with safety tab in place.

OFF: If the AUTO REC function is not required, be sure to set the switch to OFF; otherwise recordings could be erased by accident.

## ALARM REC switch

ON: To switch to the 3-hour (VHS/SP) recording mode or 6-hour (VHS/LP) recording mode when an alarm signal is input in time lapse recording mode. The recording mode can be set to continue for 15 sec, 3 min, to the tape end, or while alarm pulses are being input. If the FF or REW button is pressed in the Play or Stop mode, the tape enters the alarm search mode.

(The tape then enters the playback mode from the alarm cue point.)

OFF: To continue recording in the same mode with no alarm recording operation.

## REPEAT REC/PLAY switch

ON: When the end of the tape is reached in recording, the tape is rewound and recording restarts automatically from the start. When the end of the tape is reached in playback, the tape is rewound and playback restarts automatically.

OFF: No repeat operation.

## ON SCREEN ON/OFF switch

ON: Time/date information is recorded together with the input signal and is superimposed on the monitor screen.

OFF: No information is recorded or superimposed.

## TRACKING (+/-) buttons

If noise bars can be seen during playback, double-speed playback and slow search, use these buttons to minimize

their effect. Tracking is reset to normal when both buttons are pressed together, a cassette is ejected, or the power plug is disconnected.

## VIDEO MODE select switch

Select one of the three positions according to the input signal during recording or the output signal during playback.

COLOUR: Set to this position when the input or playback video signal is a colour signal.

AUTO: The circuit is automatically switched between colour and black/white, allowing optimum recording and playback. When this position is used with black/white signals, a higher picture resolution can be obtained. Normally set this switch at this position.

BW: Set to this position when the input or playback signal is a monochrome signal. Higher picture resolution will be obtained.

## TIMER/TDG buttons

COUNTER RESET button: Press to reset the counter on the FDP to "00 00".

TIMER button: Press to engage the TIMER standby mode after you have preset the time for unattended recording.

PROGRAM/CLOCK button: Press to change the display to the timer set mode.

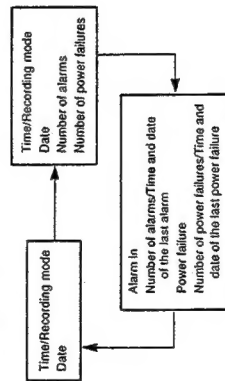
CANCEL button: Press this button at any time during timer programming to clear the program, or use to engage the cancel program mode.

SET (+/-) button: Press these to adjust the displayed data when setting the clock and programming the timer.

SHIFT (NEXT/BACK) buttons: Press these to change displayed figure when setting the clock and programming the timer.

ON SCREEN SELECT button

Selects the on-screen display mode between the following three.



## TDG Position V/H buttons

Use to shift the position of the superimposed time and date characters in the vertical and horizontal directions. (See page 16.)

H: Horizontal direction

V: Vertical direction

REPEAT button

Press to repeat programmed timer data weekly.

ALARM indicator

Lights when an alarm recording starts.

## Fluorescent display panel (FDP)

TIMER mode indicator

Switchable display

Clock

Timer start time

Cassette loaded indicator

Alarm search, status display

Switchable display

Tape counter

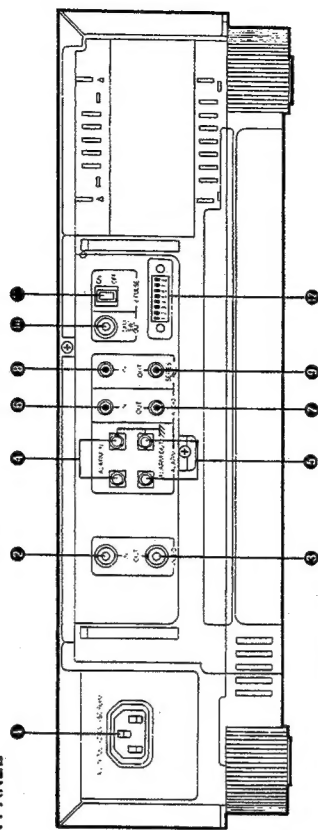
Timer stop time

Date

Cancel program

Timer programming aids

## REAR PANEL



## AC input socket (AC IN 220V-240V)

Connect to a 220V-240V AC, 50/60 Hz power outlet.

## VIDEO IN connector

Input connector for composite video signal.

## VIDEO OUT connector

Output connector for composite video signal.

## ALARM INPUT terminal with GND

Accepts alarm signals; minimum pulse width is more than 20 msec.

The terminal uses an input-grounding type contact.

## ALARM OUTPUT terminal with GND

Outputs alarm signal.

## AUDIO IN connector

Input connector for audio signal.

## AUDIO OUT connector

Output connector for audio signal.

## SERIES REC IN terminal

Accepts a signal for series recording. With this input, the BR-9060E is automatically changed from the Stop mode to the Record mode. Connect this terminal to the SERIES REC OUT terminal of the preceding video recorder.

## SERIES REC OUT terminal

Delivers a signal at the end of the tape so that a second time-lapse video recorder can operate for recording in series. Connect this terminal to the SERIES REC IN terminal of the subsequent video recorder.

## CAMERA SW OUT connector

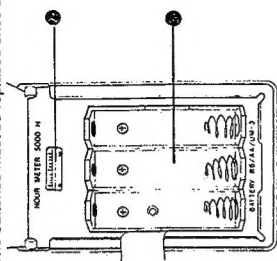
Delivers a command signal for camera switching to a camera sequential switcher.

## TOP PANEL

### HOUR METER (5,000 hours)

### Battery Holder

Note: The batteries backing up the time/date generator. For the batteries must be replaced once a year.



## Note:

Low active pulse, width: 5 m sec.

## V-PULSE switch

Usually set to OFF. When signals are supplied by non-interlaced cameras, set to ON for reducing vertical danding of the playback picture on the monitor.

## DIP switch

Remove the cover with a screwdriver.

1. REC MODE select switches

ON: SP mode

OFF: LP mode

2.3. REC TIME select switches

REC TIME	Alarm period	15 sec.	3 min.	Tape End
SW2	ON	ON	ON	OFF
SW3	ON	ON	OFF	OFF

4.5. CAMERA SWITCHING OUTPUT select switches

Set the camera switching interval using switches No. 4 and 5. Normally set them for 25 or 50 frame mode.

Output limiting	1 FRAME	2 FRAME	25 FRAME	50 FRAME
SW4	ON	ON	OFF	OFF
SW5	ON	ON	OFF	OFF

6. AUTO REWIND mode select switch

OFF: No AUTO REWIND operation

ON: AUTO REWIND mode

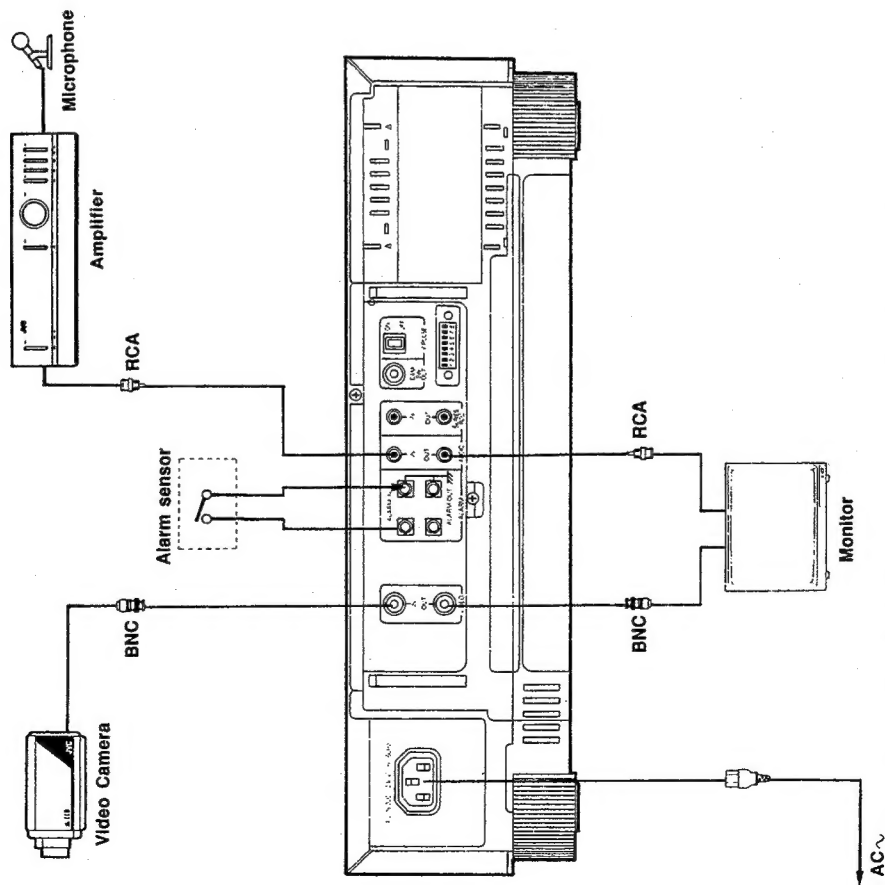
7. 480H/960H time-lapse recording mode select switch

ON: 480 H

OFF: 960H

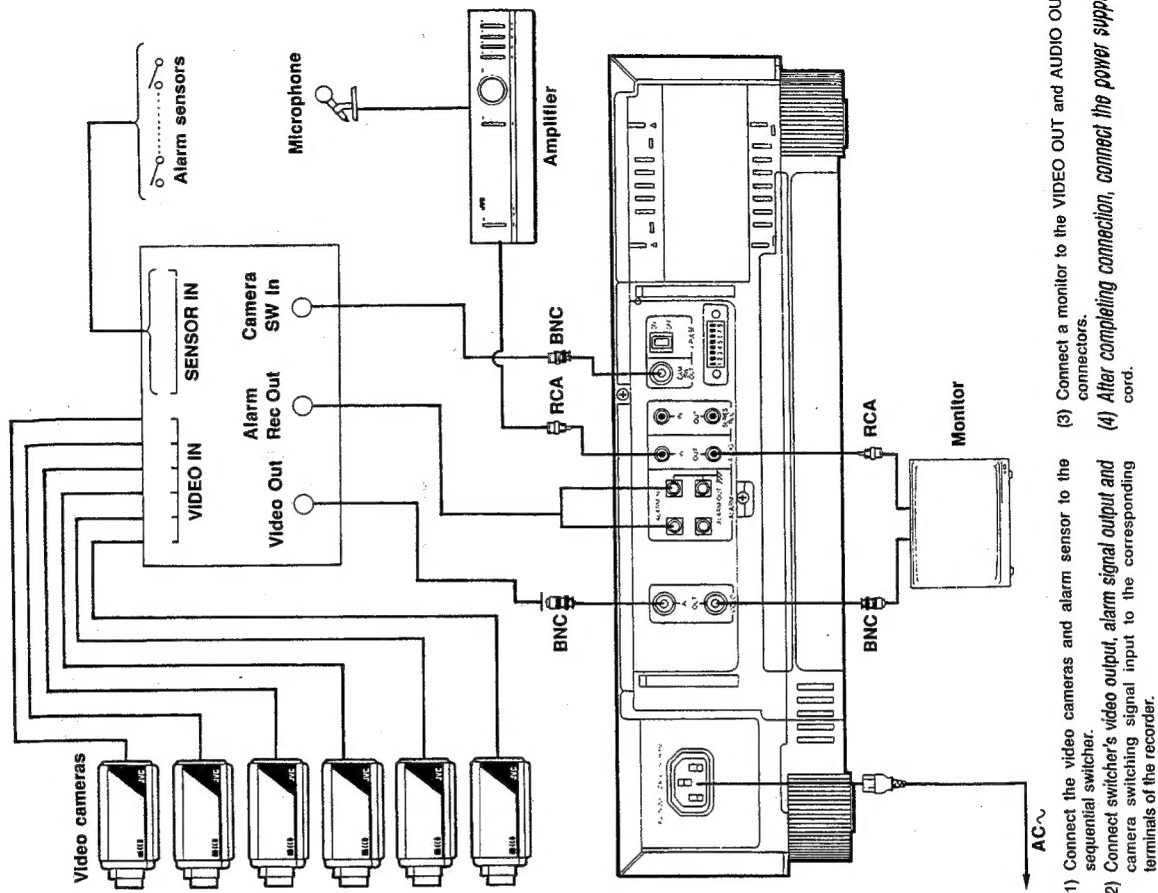
## CONNECTIONS

### I Connection to a camera with a built-in SSG



- (1) Connect the rear panel VIDEO OUT and AUDIO OUT connectors to a monitor.
- (2) Connect the video output of the camera to the VIDEO IN connector.
- (3) If an audio input is required, connect a microphone to the AUDIO IN connector via an optional amplifier.
- (4) If an alarm sensor is to be used, connect across the ALARM INPUT terminal and GND.
- (5) After completing connection, connect the power supply cord.

### II Connection to several cameras using a sequential switcher



- (1) Connect the video cameras and alarm sensor to the sequential switcher.
- (2) Connect switcher's video output, alarm signal output and camera switching signal input to the corresponding terminals of the recorder.
- (3) Connect a monitor to the VIDEO OUT and AUDIO OUT connectors.
- (4) After completing connection, connect the power supply cord.



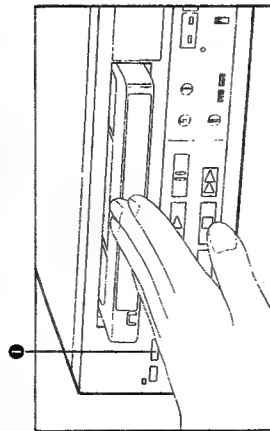
## LOADING AND UNLOADING A VIDEO CASSETTE

### Loading

- Insert a cassette as illustrated with its labelled side facing you.
- With a cassette inserted, the **RECORD** mark to indicate "cassette inserted" appears on the display panel.

### Unloading

Press the **EJECT** button ①. The cassette will be ejected.



### Notes:

- Be sure to insert the cassette firmly into the slot; otherwise, it will be automatically rejected.
- The automatic loading mechanism will operate only when the cassette is inserted correctly.

### Caution

- If unloading of a cassette is not possible, check to see whether the **TIMER** indicator is lit. If so, press the **TIMER** button so the **TIMER** indicator extinguishes.
- Do not attempt to pull out the cassette once automatic loading has started.

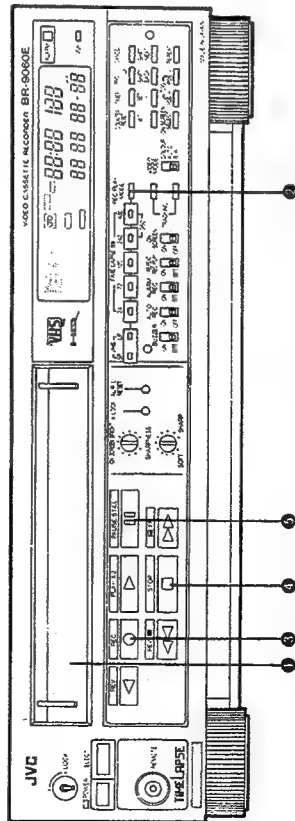
### WARNING

- Do not insert fingers or any foreign object beyond the door flap of the cassette loading slot, as this could lead to injury or damage to the mechanism. Show special caution with children.

### Motorized loading system

- The cassette can be loaded even when the power has not been turned on. Inserting a cassette into the loading slot turns the power on automatically.

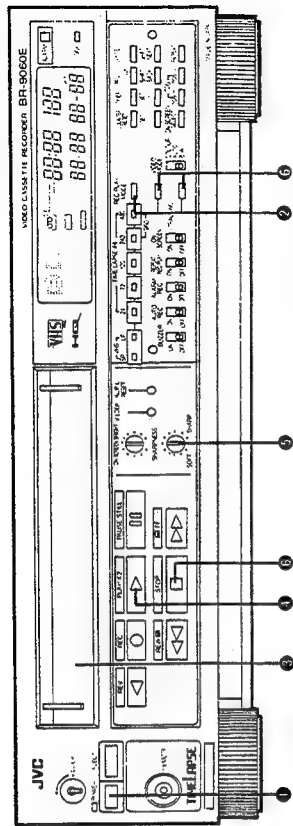
## RECORDING



- Insert a video cassette into the cassette loading slot.
- Set the **REC/PLAY** MODE button as required.
- Press the **REC** button to ON. The record mode will be engaged and the **REC** indicator on the FDP will light.
- Press the **STOP** button to stop recording.
- RECORD-PAUSE**
  - Press the **PAUSE/STILL** button ⑤ to stop recording temporarily.
  - Press the **PLAY/X2** button to restart recording.

Note: If left in the Pause mode for more than about 5-1/2 minutes, the VTR will enter the Stop mode.

## PLAYBACK



- Press the **POWER** button on.
- Set the **REC/PLAY** MODE button as required.
- Insert a pre-recorded cassette into the cassette loading slot.
  - When the cassette loaded has no safety tab, playback starts automatically.

### Note:

- Noise bars may appear on the screen if you play back a tape which was recorded using another VTR. In such cases, adjust the **TRACKING** controls ③. Press one of the buttons

- Press the **PLAY/X2** button. The tape will start running and the playback picture will appear on the monitor screen.
- Adjust the picture as required with the **SHARPNESS** control.
- Press the **STOP** button to stop playback.

to correct the picture referring to the monitor. After playback, tracking may be reset manually by pressing both buttons simultaneously. It is reset automatically when the tape is ejected or the power cord pulled out.

## SPECIAL-EFFECTS PLAYBACK

### SHUTTLE SEARCH

When the **REW** or **FF** button is pressed in the Stop mode, normal rewind or fast forward takes place. When these buttons are pressed in the Play, or Still mode, the tape runs at about 9 times normal speed in the corresponding direction. The buttons can be locked and the indicator lights.

You can follow the speeded-up picture on the monitor screen.

- For brief scanning, keep the **REW** or **FF** button pressed for more than 2 seconds; when you release the button, the Search mode will be cancelled.

### ALARM SEARCH

When the **ALARM** REC switch on the front panel is set to ON, pressing **FF** while in the Play or Still mode for less than 2 seconds initiates alarm search in the forward direction and pressing **REW** for less than 2 seconds initiates alarm search in the reverse direction. When the tape reaches the start of an alarm recording, it enters the playback mode automatically. During alarm search, the "VSS" mark on the FDP will light.

### Note:

- If the **FF** or **REW** button is pressed in the Stop mode, the tape stops at the start of an alarm recording.

### STILL & FRAME ADVANCE

### Note:

- When the **PAUSE/STILL** button in the Play mode, the tape will stop and a still picture will be obtained.
- To advance the still picture, press again.
- To return to the normal Play mode, press the **PLAY/X2** button.

- When the **STILL** mode continues for longer than about 5 minutes, the **STOP** mode will be entered automatically.
- Turn the **V-LOCK** control to eliminate shaking of the picture.

## REVERSE PLAYBACK

- Press the REV button in the PLAY mode; the tape will be played back in reverse at normal speed.
- To cancel reverse playback, press the PLAY, STOP, STILL or SEARCH button.

## DOUBLE-SPEED PLAYBACK

- Press the PLAY/X2 button in the Play mode; double-speed playback will be engaged.
- To resume normal playback, press the same button again.

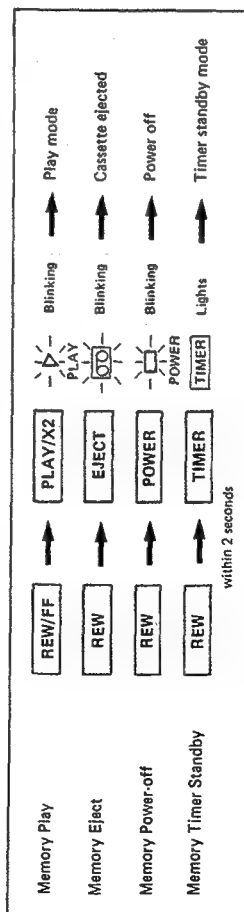
## NEXT-FUNCTION MEMORY

### Memory Play function

- If you want to watch the tape from its beginning after rewinding, press the REW button and then PLAY within 2 seconds. Playback will start automatically at the beginning of the tape.
- While the tape is being rewound, the PLAY indicator is blinking. To cancel the Memory Play mode and go to another mode, press the corresponding button (STOP, PLAY, FF, REW, EJECT, Power OFF).

### Memory Eject/Power-Off/Timer Standby

- If you are going to eject the cassette, turn the power off or engage the Timer Standby mode after rewinding the tape, you don't have to wait for completion of rewind to press the corresponding button.
- To eject the cassette after rewind, press REW and then EJECT within 2 seconds. (To cancel the Memory Eject mode, press STOP, PLAY, FF or REW.)
- To turn the power off after rewind, press REW and then POWER within 2 seconds. (To cancel the Memory Power-off mode, press POWER.)
- To engage the Timer Standby mode after rewind, press REW and then TIMER within 2 seconds. (To cancel the Memory Timer Standby mode, press TIMER or Power.)

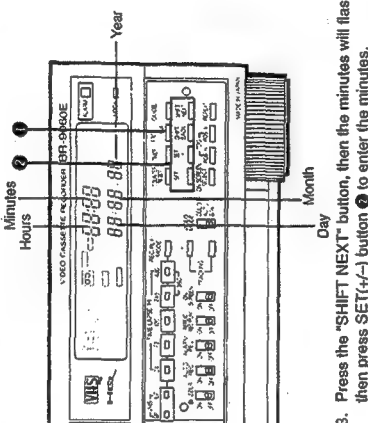


## CLOCK ADJUSTMENT

Plug the recorder into an AC outlet. "SU" and "0:00" will flash on the FDP.

- If left for longer than one minute, this mode is cancelled.
- Press the PRG/CLK button ① to enter the clock adjust mode.

- Press the SET(+/-) button ② to enter the hours.
  - If one digit is to be input, press "SHIFT NEXT", then the digit.

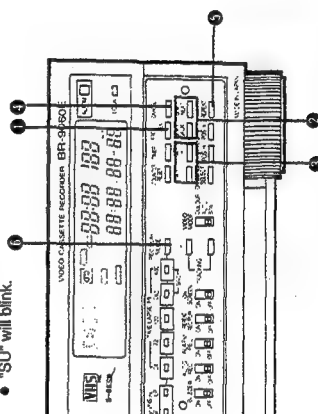


- Press the "SHIFT NEXT" button, then the minutes will flash, then press SET(+/-) button ④ to enter the minutes.

## PROGRAM TIMER SETTING

To program the timer, the clock must have been set correctly.

- Turn on the power and press the PRG/CLK button ① to set to the Program Timer Set mode.
  - Program number "1" will blink.
  - To advance to programs 2 to 8, press the "SET +" button the required number of times. After program 8 the display will return to the clock mode.
- Verify the program to be set by pressing the SHIFT NEXT button.
  - "SU" will blink.



- Press the "SHIFT NEXT" button, then the day will flash. Press the SET(+/-) button ② to enter the day.
- Press the "SHIFT NEXT" button, then the month will flash. Press the SET(+/-) button to enter the month.
- Press the "SHIFT NEXT" button, then the year will flash. Press the SET(+/-) button to enter the year (last two digits).
- Timekeeping will start when the PRG/CLK button is pressed.

### Notes:

- The correct day of the week will be displayed automatically.
- If you want to alter the setting of only one entry, the flashing digits can be changed by pressing the "NEXT" and "BACK" buttons.
- The seconds will be reset to "00" by pressing the SHIFT (NEXT/BACK) or SET(+/-) button in the Clock Adjust mode.
- When re-adjusting the time, pressing the PRG/CLK button repeatedly changes the display mode in the following sequence:
  - Timer mode → Clock Adjustment mode → Clock mode

### Power failure indicator

The entire clock display may be reset to SU 0:00 and start to flash. This is not a malfunctioning of the clock, but it indicates that the batteries are discharged. Re-adjusting the time with replaced batteries restores the normal condition of the clock display.

- Then set the desired data by selecting the item to be set (day, starting time, and stop time) with SET(+/-) buttons ④ and verify the data for each time with the SHIFT (NEXT/BACK) buttons ③.
  - The data is also displayed on the monitor screen.
  - To see the on-screen data, supply a composite video signal to the video input connector.
  - To cancel the program, press the CANCEL button ⑤.
  - To repeat this program weekly, press the REPEAT button ⑥.

- To select the recording mode, set the REC/PLAY MODE select button ⑦ on the front panel.
- After one program has been set, to move to the next program, press the SHIFT NEXT button ③.
- When data has been set, press the PRG/CLK button again.

### Notes:

- The lens place will also change accordingly when the units place is advanced or reversed by pressing the SET(+/-) button.
- When the SHIFT NEXT button is pressed after the starting time has been set, the same time is displayed for the stop time.

## ON-SCREEN DISPLAY

### Variety of day setting possibilities

No.	Setting	Setting method	Indication FDP
1	One day of the 1st week (week after week)	SET (+ REPEAT)	
2	One day of the 2nd week (week after week)	SET (+REPEAT)	
3	Daily recording from Sunday through Saturday (week after week)	SET (+ REPEAT)	
4	Daily recording from Monday through Saturday (week after week)	SET (+ REPEAT)	
5	Daily recording from Monday through Friday (week after week)	SET (+ REPEAT)	

- As the SET (+) button is pressed, the indication progresses in sequence from No. 1 to No. 5 of the above settings and then returns to No. 1.
- REPEAT indication is available by pressing the REPEAT button at any time in the setting procedure.

**Note:**

- The 1st week or 2nd week do not refer to weeks on the calendar; the 1st week refers to the seven-day period from the present day and the 2nd week, to the following seven-day period. These two weeks are counted from the time of setting.

### Error indication

- When the **TIMER** button is pressed with a cassette loaded and the timer correctly programmed, the **TIMER** indicator on the display will light with the corresponding preset program number(s) also lighting and the power is turned off.
- When you have preset several programs at a time, confirm that all the preset program numbers light together with the **TIMER** indicator when the **TIMER** button is pressed. The program whose number does not light has not been correctly preset. Reread the programmed data. If two or more programs have overlapping times, the **OVER LAP** indicator on the FDP will blink rapidly after the **TIMER** button has been pressed. If no change is made in the programmed data, later programs will begin only after earlier programs are completed.
- Tape loading starts 20 seconds before the preset start time and the recording start signal is triggered 2 seconds before the preset time so that recording starts exactly at the preset time.
- During timer recording, the number of the program that is presently operating will be blinking.
- If the end of the tape is reached during timer recording, the **Auto Rewind** mode is engaged and, after rewind to the tape beginning, recording will re-start if the **REPEAT RECI/PLAY** switch is set to ON. (If the **REPEAT RECI/PLAY** switch is set to OFF, the cassette will be ejected.) If the preset time expires during rewind, the power is switched off.
- When the tape is ejected at the tape end during timer recording, replace the cassette and press the **REC** button.

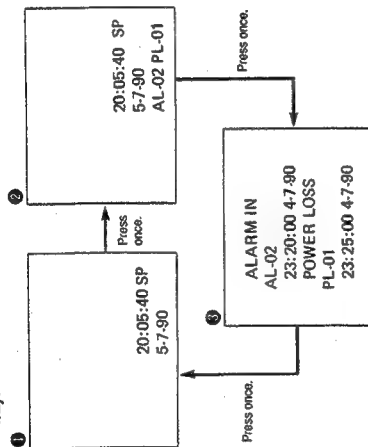
- If all programs have been wrongly preset, the **TIMER** indicator will blink for about 10 seconds when the **TIMER** button is pressed, and then the Timer Standby mode will be cancelled.
- If the **TIMER** button is pressed when a cassette is not loaded, the **TIMER** indicator will continue blinking.

### Checking the programmed data

- To do this, press the recorder's PRG/CLK button while in the Timer Standby mode. The FDP will show programmed data for 5 seconds for each program number by automatic switching. You can also check each program by advancing program numbers manually with the SET + button. (If left for more than 60 seconds, this display will be cancelled.) If re-programming is required, disengage the Timer Standby mode and use the regular programming method.

### 1. Normal display mode

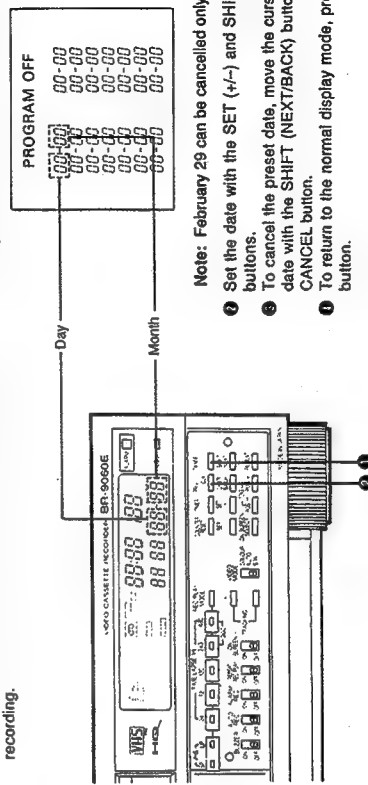
Each time the front panel ON SCREEN SELECT button is pressed, the on-screen display changes in the following way:



- 1 Time/Date generator data to be recorded (hours, minutes, seconds, recording mode, day, month, year)
- 2 Number of alarm inputs and power failures, in addition to 1.
- 3 Under ALARM IN, the number of alarm inputs, and the time/date when the last alarm recording occurred are displayed. Also, under POWER LOSS, the number of power failures and the time/date when the last power failure occurred.
- 4 Up to 99 can be displayed for both alarm inputs and power failures.
- 5 Press the ALPT/RESET button to clear the numbers.

## 2. Cancel Program mode

- After setting the timer for daily or weekly recording, up to 14 days in a year can be cancelled so that timer recording will not be executed on those days. For instance, 14 consecutive days or 14 Sundays can be omitted from timer recording.



- **Note:** February 29 can be cancelled only in leap years.
- Set the date with the SET (+/-) and SHIFT (NEXT/BACK) buttons.
- To cancel the preset date, move the cursor to the relevant date with the SHIFT (NEXT/BACK) buttons and press the CANCEL button.
- To return to the normal display mode, press the PRG/CLK button.



## INSTANT TIMER RECORDING

After you start recording, the recorder can be set to stop automatically after a certain period of time.

- Press REC button while recording (or twice if in the Stop mode).
- The following indication will appear on the display, to show that the recorder is recording in the Instant Timer Recording mode and power will switch off after 30 minutes.



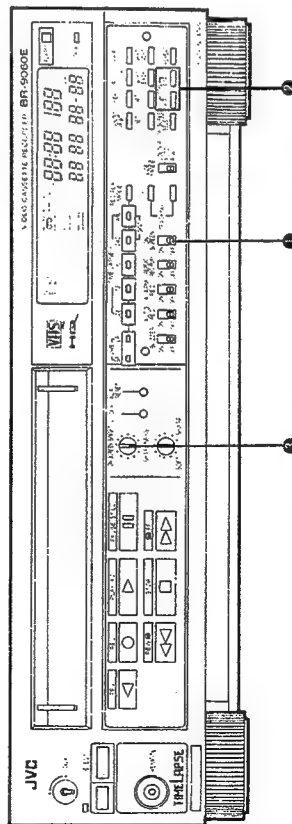
Each time the REC button is pressed, recording time increases by 30 minutes to a maximum of 9 hours. If the REC button is pressed again, the Normal Recording mode will be entered.



For a more precise time setting, use the SET +/- and SHIFT NEXT/BACK buttons to set to the exact time required.

- After "0:30" has appeared, press to set to the exact time required.
- Press REC button so that the digits stop blinking.

## TIME/DATE GENERATOR



The built-in time/date generator allows the time and date to be superimposed on the video image and recorded.

Set the Clock Time accurately as described on Page 12.

- Set the ON SCREEN switch to ON.
- Move the cursor to the appropriate position on the screen with the TDG "H" and "V" Position buttons. The cursor can be moved to the left in 13 steps by pressing the "H" button. The cursor can be moved up the screen in 16 steps by pressing the "V" button. When the cursor is at the left or top of the screen, the next time the button is pressed, it will return to the right or bottom of the screen.

- The brightness of the time/date display can be adjusted using the ON SCREEN BRIGHT control. Turn clockwise for a brighter display and counterclockwise for a darker display.

## SERIES RECORDING

Series recording refers to successive recording with more than one recorder, allowing unattended recording for an extended time.

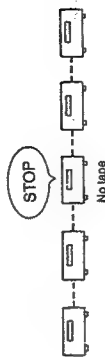
### OPERATION

- Load cassettes in the required number of recorders and locate the starting position for each tape.



Load cassettes in all recorders.

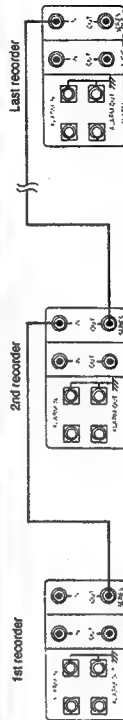
- Start recording with the first recorder. When the tape in the first recorder comes to an end, the second recorder starts recording automatically. Likewise, recording continues to the end of the tape of the last recorder.



Note:

- If a cassette is not loaded in one of the recorders, series recording stops there.

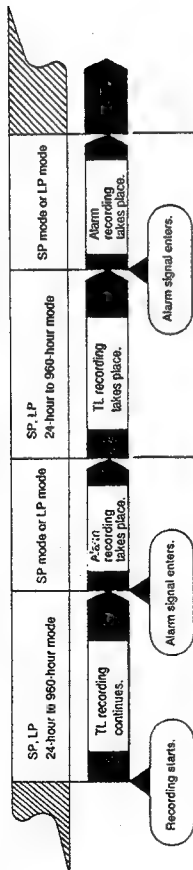
### CONNECTION



- Connect the SERIES REC OUT terminal ⑤ of the 1st recorder to the SERIES REC IN terminal ③ of the 2nd recorder. Connect the SERIES REC OUT terminal of the 2nd recorder to the SERIES REC IN terminal of the 3rd recorder, and so on.

## ALARM RECORDING

When an unusual incident is observed in the scene being recorded in the Time Lapse mode and an alarm is given, the Recording mode changes automatically to a faster speed for more detailed coverage of the incident.



- An alarm sensor can be connected across the ALARM INPUT and GND terminals.
- Set the REC/PLAY MODE button to TL 24, 120, 240, 480, or 960.
- Set the ALARM REC switch to ON.

## SPECIFICATIONS

<b>GENERAL</b>	
Recording system	: Lumina — FM Chroma — Down-converted PAL/CCIR, 625 lines
Signal system	: 23.39 mm/s (VHS SP)
Tape speed	: 11.70 mm/s (VHS LP)
Record/Play time	: 3, 6, 24, 72, 120, 240, 480 and 960 hours (with E-180 video cassette)
Operating temperature	: 5°C to 40°C
Operating humidity	: 35 % to 80 %
Storage temperature	: -20°C to 60°C
Power requirement	: 220-240 V AC, 50/60 Hz
Power consumption	: 30 watts
Dimensions	: 435(W) x 124(H) x 370(D) mm
<b>VIDEO</b>	
Input	: 0.5 to 2.0 Vp-p, 75 ohms, unbalanced, BNC
Output	: 1.0 Vp-p, 75 ohms, unbalanced, BNC
Horizontal resolution	: Colour-240 lines (VHS SP) BW-300 lines (VHS LP)
S/N ratio	: More than 43 dB (VHS SP)
<b>AUDIO</b>	
Number of tracks	: 1
Input	: -8 dBs, RCA
Output	: -8 dBs, RCA
S/N ratio	: 40 dB (at 3% distortion)
<b>TIME/DATE GENERATOR</b>	
Display	: Day, month, year, hours, minutes, seconds, Recording mode
Character size	: 16H
Power backup	: Approx. one year
<b>ALARM</b>	
Alarm input	: Ground input
Alarm output	: Alarm input through-out, RCA
Camera switching output	: Negative pulse output (approx. 5 ms), BNC
<b>SERIES RECORDING</b>	
Series input	: Ground input, RCA
Series output	: Series input through-out, RCA
Accessories	: "R6" batteries x 5 Remote control unit x 1 Switch cover x 1 Lock key x 2

## IN CASE OF DIFFICULTY

Symptom	Cause	Remedy
No power is applied to the recorder.	• Power cord is unplugged.	• Plug in the power cord.
Tape control buttons do not function.	• TIMER switch is set to ON.	• Release the key lock and set the TIMER switch to OFF.
Playback picture does not appear while tape is running.	• Monitor is not connected correctly.	• Check the connections.
Noise bars are visible during playback.	• TRACKING control is not correctly adjusted.	• Turn the TRACKING control slowly in either direction to move the noise bars off the screen.
Playback picture is blurred or interrupted.	• Video heads may be dirty.	• Head cleaning is necessary. Consult your nearest JVC dealer.
No audio is available during playback.	• No audio signal is recorded during TL recording.	• Check the mode in which the tape was recorded.
Recording is not possible.	• Safety tab is removed from the cassette.	• Change the cassette to one with safety tab in place.
Timer recording is not possible.	• TIMER indicator is off. • The time/date generator is not correctly preset.	• Press the TIMER switch set to ON. • First set the clock time correctly, then program the timer.

## SECTION 1 DISASSEMBLY

### 1.1 REMOVING OF EXTERNAL COVERS

- **Top cover**

Remove six screws (A).

- **Front panel assembly**

1. Remove the top cover.
2. Disengage three upper hooks of the front panel ass'y by lifting them upward.
3. Remove the front panel ass'y in a manner to turn it to this side.

- **Operation board**

1. Remove the front panel.
2. Remove six screws (C) and then remove the front lock and the cover bracket.

- **Bottom cover**

Remove seven screws (B).

- **Cassette housing door**

1. Remove the front panel ass'y.
2. Pull the cassette housing door by the center to this side in a manner to bend the door. Then, it is disassembled from the main body by the section (D).
3. Paying attention to a torsion spring set on the left hand, remove the cassette housing door.

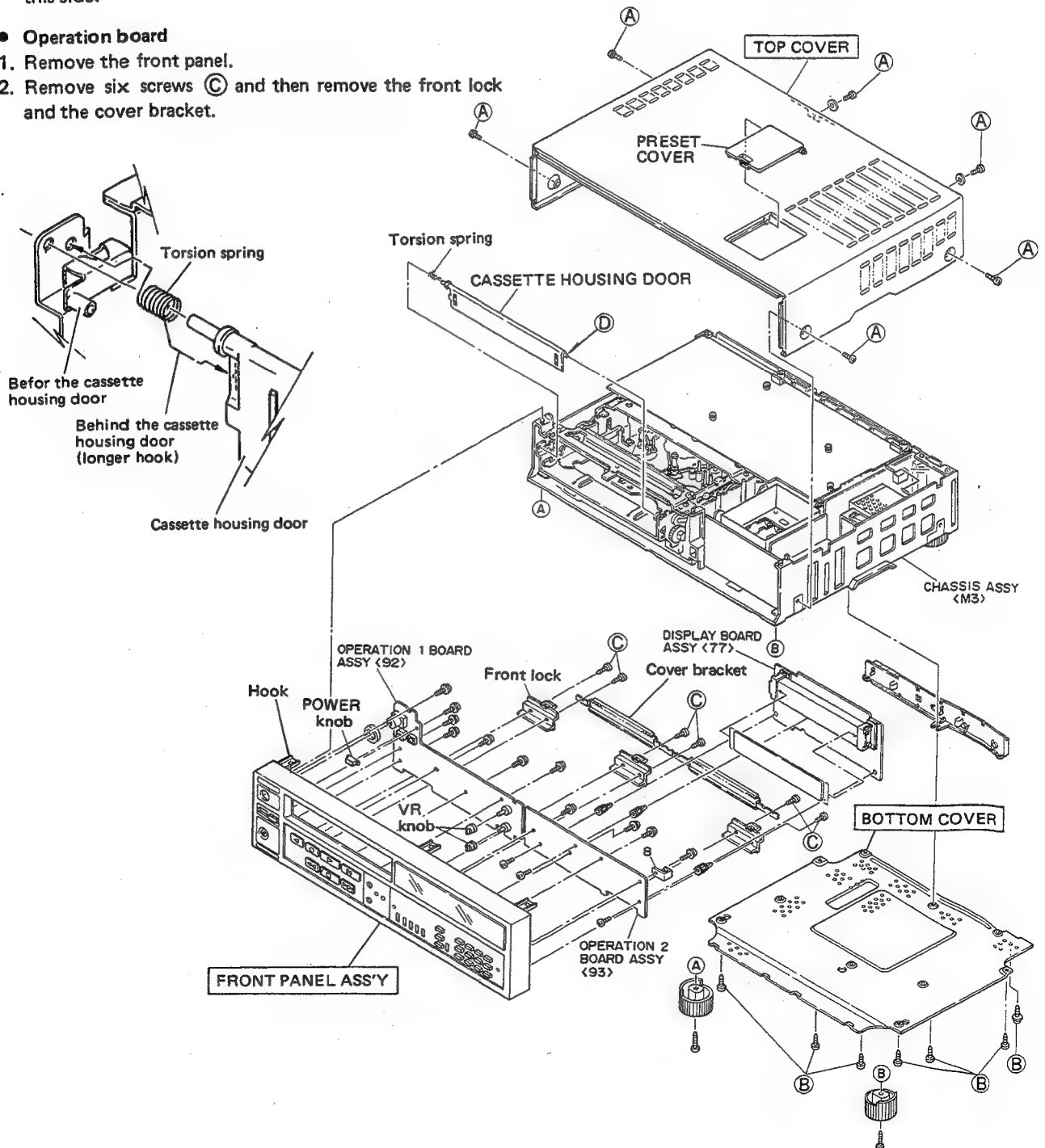


Fig. 1-1 Removing of external covers



## 1.2 REMOVING OF MAIN BOARDS

Board No.	Board Name
0 1	SWITCHING P.S
0 2	REGULATOR
0 4	MAIN
	<VIDEO Y SECTION>
	<VIDEO C SECTION>
	<AUDIO SECTION>
0 5	D/C SERVO
0 6	TIMER LAPSE SERVO
0 7	MECHA CON
0 8	TIME LAPSE SUB SERVO (1)
0 9	TIME LAPSE SUB SERVO (2)
1 0	VIDEO SUB
1 2	A/C HEAD
4 1	UPPER DRUM
4 3	VIDEO PRE/REC
5 1	DECK TERMINAL
5 2	RELAY
5 3	REC SAFETY
5 4	END SENSOR
5 6	CASSETTE HOUSING
7 4	ON SCREEN DATA/BATTERY (1)
7 5	ON SCREEN DATA/BATTERY (2)
7 6	REAR
7 7	DISPLAY
7 8	CLEANER
7 9	TIMER
9 2	OPERATION 1
9 3	OPERATION 2

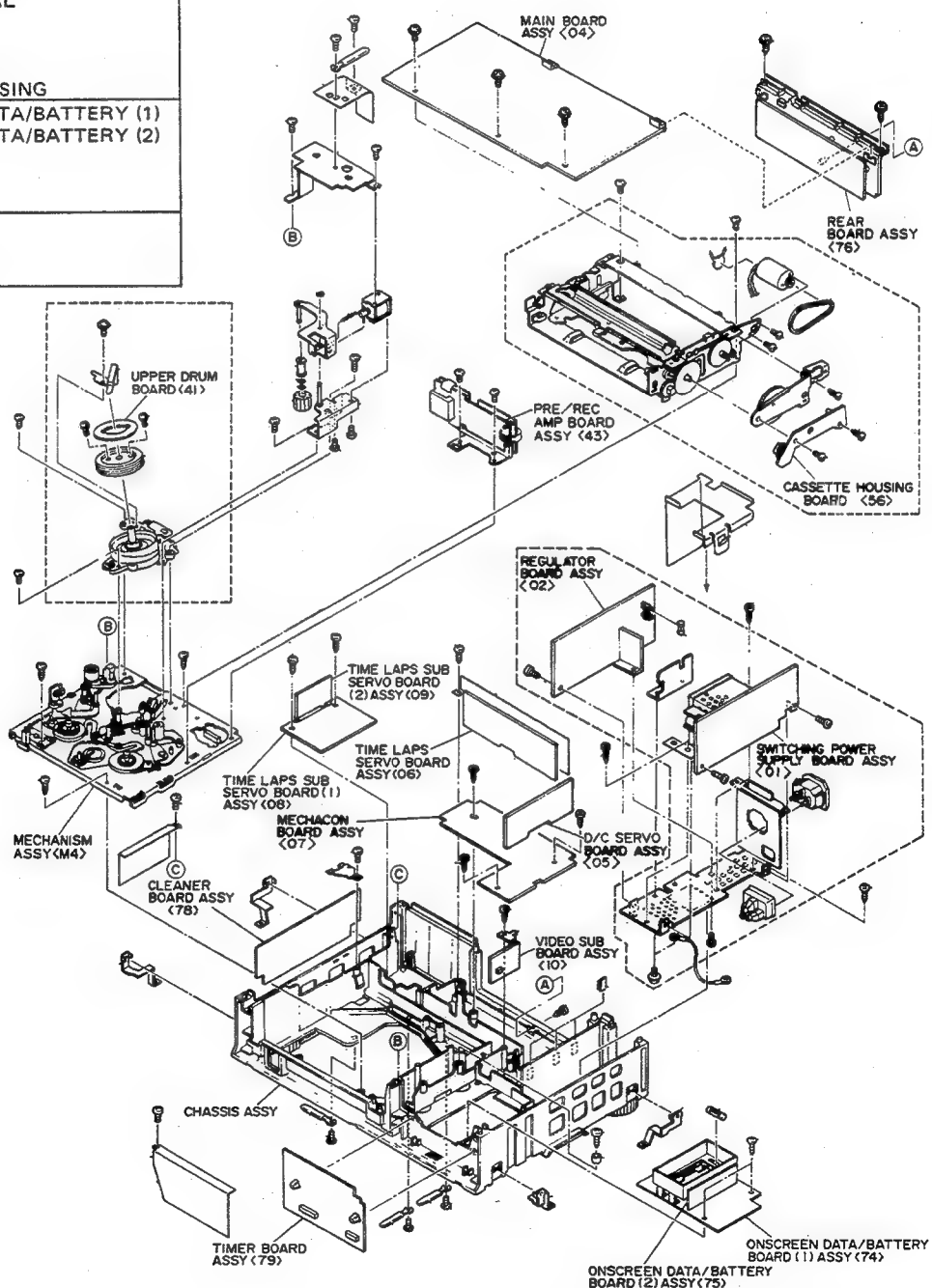


Fig. 1-2 Removing of main boards

### 1.3 REMOVING OF MAIN BOARD

1. Remove the top cover.
2. Refer to Fig. 1-3 and take out 3 screws (E) from main board assembly.

**Note:** Make sure not to remove the screws indicated by the asterisk (\*) mark.

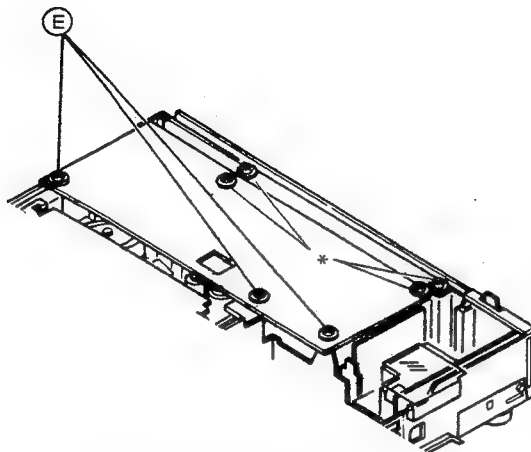


Fig. 1-3 Removing of MAIN board

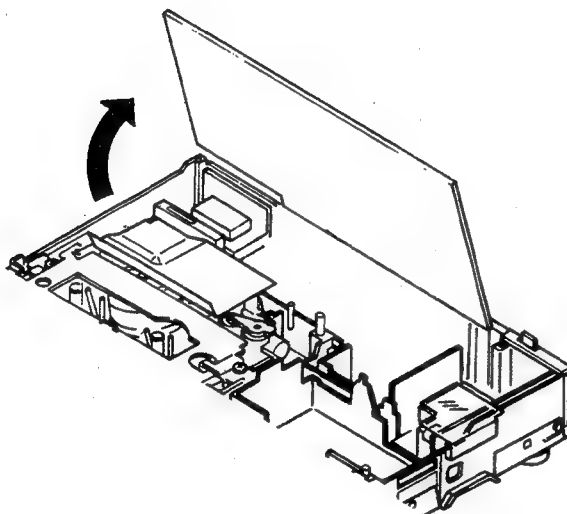


Fig. 1-4 How to lift up MAIN BOARD

### 1.4 REFERENCE

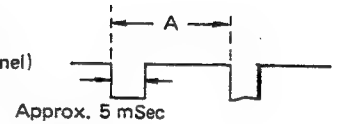
#### • SERIES REC PULSE

SERIES REC OUT



#### • CAM SW PULSE

CAM SW OUT (Rear Panel)



DIP SW		PULSE OUT INTERVAL A
④	⑤	
ON	ON	40 mSec (1 Frame)
ON	OFF	80 mSec (2 Frame)
OFF	ON	1.0 Sec (25 Frame)
OFF	OFF	2.0 Sec (50 Frame)

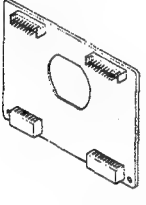
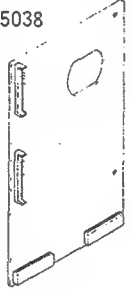
#### • TIME LAPSE REC INTERVAL

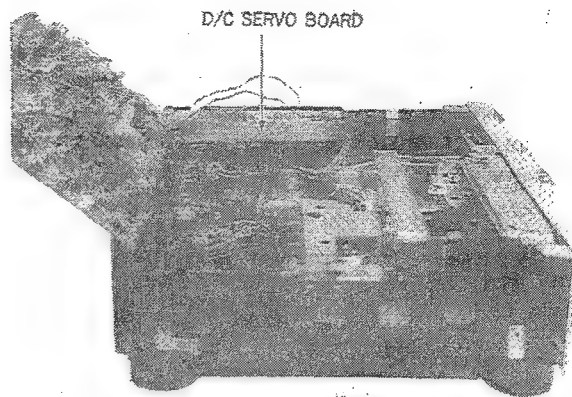
REC MODE	REC INTERVAL
24 H	9 FRAME (180 mSec)
72 H	25 FRAME (500 mSec)
120 H	41 FRAME (820 mSec)
240 H	81 FRAME (1620 mSec)
480 H	161 FRAME (3220 mSec)

## 1.5 USAGE OF EXTENSION BOARD

Two kinds of extension boards are prepared for BR-9060. They are not required for adjustment but necessary for troubleshooting and checkup in repair.

- Extension board for D/C SERVO board : PGJ05037
- Extension board for TIME LAPSE SERVO board : PGJ05038

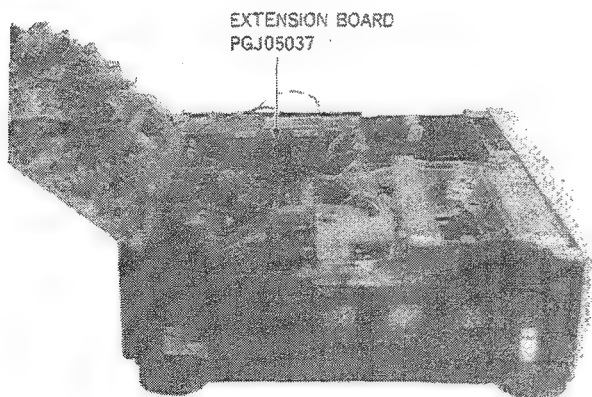
Extension board	Extension board
PGJ05037	PGJ05038
	



6. In the products whose serial numbers are before 320, the shield wire assy between the D/C SERVO board and the TIME LAPSE SERVO board may be at the very limit to do the above-mentioned connection work. (The shield wire assy of the serial No. 320 and after is a little longer.)

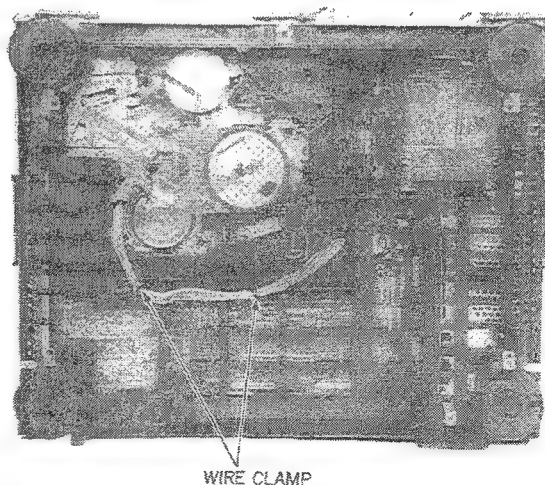
### 1.5.1 Connection of extension board PGJ05037

1. Take off the top cover.
2. Remove three screws from the A/V board and turn it up to open.
3. Disconnect connectors from the D/C SERVO board.
4. When disconnecting the D/C SERVO board from the MECHA CTL board, carefully disconnect the connectors not to hurt hands since they are tightly connected.
5. Install the extension board and replace the D/C SERVO board horizontally as it was. Then, connect all connectors between them.

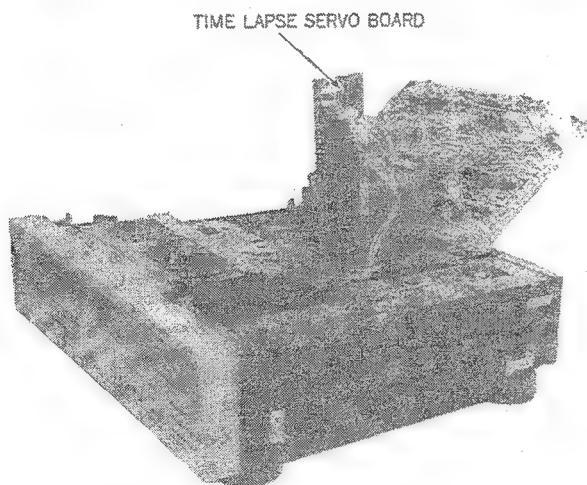
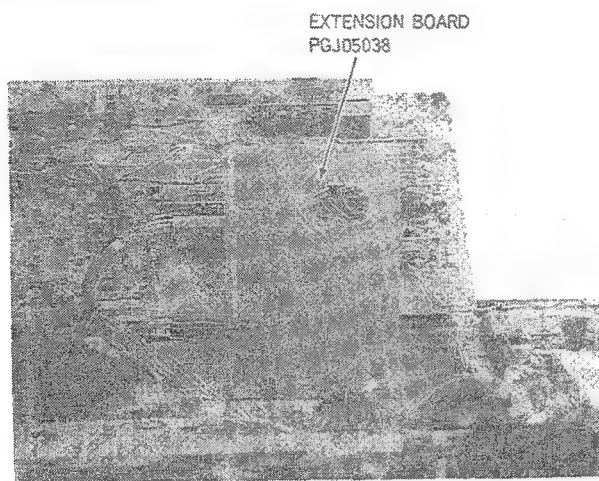


### 1.5.2 Connection of extension board PGJ05038

1. Take off the top cover.
2. Remove three screws from the A/V board and turn it up to open.
3. Disconnect all connectors from the TIME LAPSE SERVO board.
4. Remove eight screws retaining the bottom cover and take it off.
5. Release the shield wires of the capstan motor from the wire clamps in the bottom of the main deck.



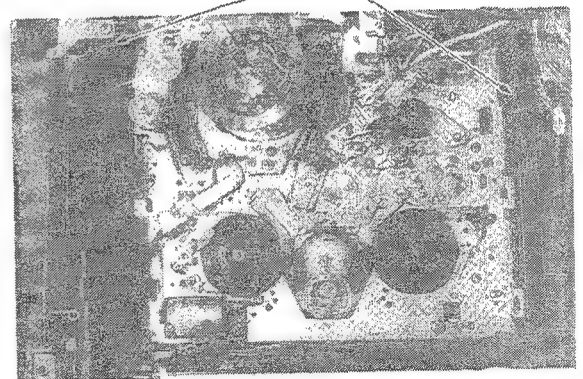
6. Disconnect the TIME LAPSE SERVO board from the MECHA CTL board with care not to hurt hands since the two boards are tightly connected by connectors. It is recommended to disconnect them after removing two screws retaining the REAR board assy and the A/V board assy.
7. Place the extension board vertically and replace the TIME LAPSE SERVO board as it was. Then, carefully pull the shield wires of the capstan motor and connect all connectors.



## 1.6 REMOVAL OF MAIN DECK

1. Take off the top cover.
2. Remove three screws from the A/V board and turn it up to open. (Refer to Section 1.3.)
3. Remove the drum cover assy.
4. Remove the cassette housing assy. (Refer to Section 2.2.)
5. Detach the cleaner assy and leave it in the left of the original position.
6. Disconnect wires including two earth wires from the A/C head, and remove the earth terminal.
7. Disconnect flat wires coming from the mechacon from the main deck. (Refer to Section 2.8.6)
8. Remove two screws retaining the PRE/REC board and lift the board upward while removing it.
9. Disconnect the connector from the upper part of the full erase head.
10. Take off the bottom cover and disconnect connectors for the capstan motor. (Refer to Section 1.5 (2).)
11. Remove three screws retaining the main deck.
12. Push the locks of the chassis assy in the both sides of the main deck while lifting the main deck by the front side of it.

Push the locks while lifting the main deck upward.



**Note:** To separate the main deck completely from the whole assembly, disconnect connectors which connect it respectively with the lower drum and the heater.



## SECTION 2 MECHANISM ADJUSTMENT

### 2.1 GENERAL

#### 2.1.1 Precautions

##### IMPORTANT:

1. Disconnect unit from power before removing or soldering components.
2. When removing a fastener (screw, washer, etc.), be careful not to drop it into the mechanism. If a fastener should be dropped, be sure to retrieve it.
3. The tape transport mechanism has been precisely adjusted at the factory and ordinarily does not require readjustment.
4. When removing a part, be very careful not to damage or displace other parts. (Be especially careful with the tape guides and rotary video head drum.)
5. For service procedures that set for the Play mode when the cassette housing is separated from the main-deck, perform as below.
  - 1) Set a sheet of insulated material on the top of chassis.
  - 2) Remove the cassette housing from the main-deck and place it on the insulated sheet, but do not disconnect the housing connector.
  - 3) Cover the cassette LED on the main-deck with an opaque cover.
  - 4) The Play mode can be obtained by using the Play switch without a cassette tape.

#### 2.1.2 Required test equipment, fixtures and tools

For proper mechanical adjustment, the following test equipment, fixtures and tools are strongly recommended. Without them, a long trial-and-error period would be necessary, resulting in possible damage. In addition, general-purpose tools are required.

##### 1. Test equipment required:

Color television or monitor

Oscilloscope: Wide-band, dual trace, triggered, delayed sweep

Recording tape

Alignment tapes

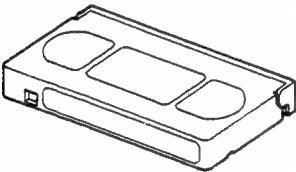
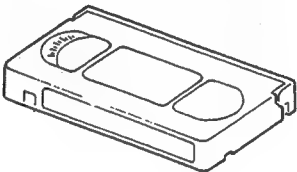
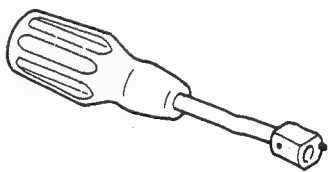
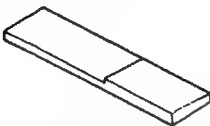
Alignment tape MHPE, MHPE-L, MBPE-X 	Cassette torque meter PUJ42881 	A/CTL head position tool PUJ47351-2 
Parallel check plate PUJ50204 		

Table 2-1-1 Fixtures and tools

### 2.1.3 Layout of main parts

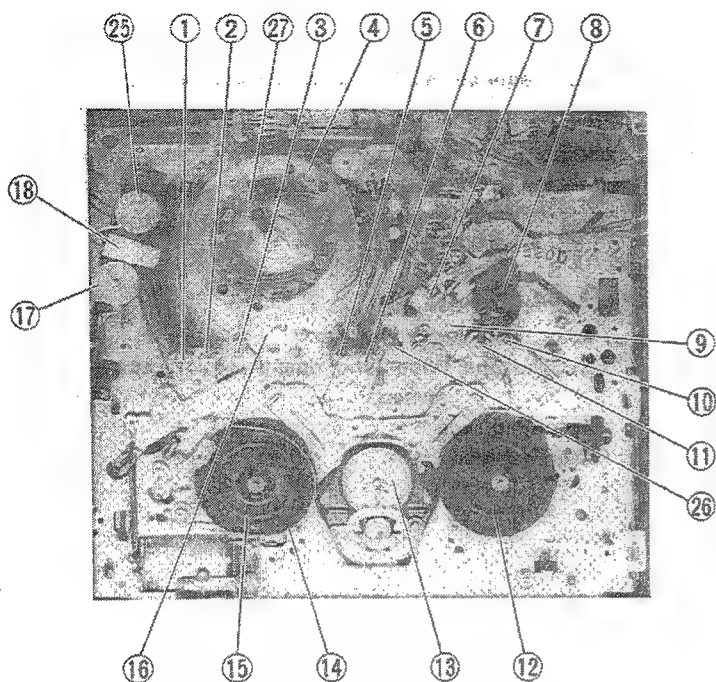


Fig. 2-1-1 Top view of main-deck

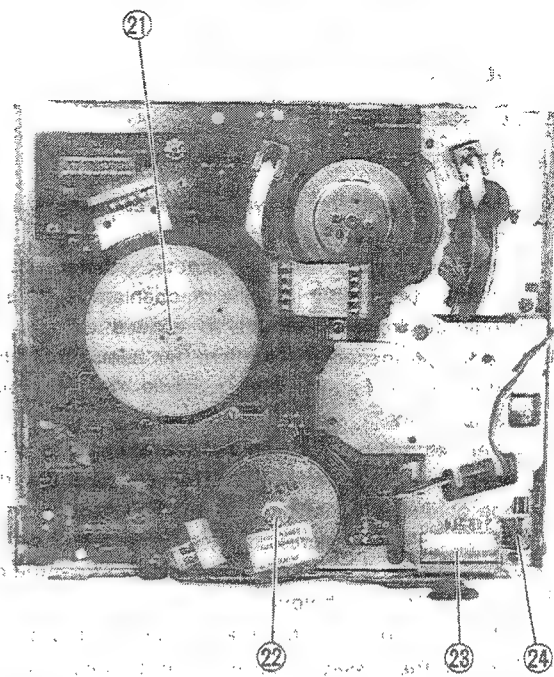


Fig. 2-1-2 Bottom view of main-deck

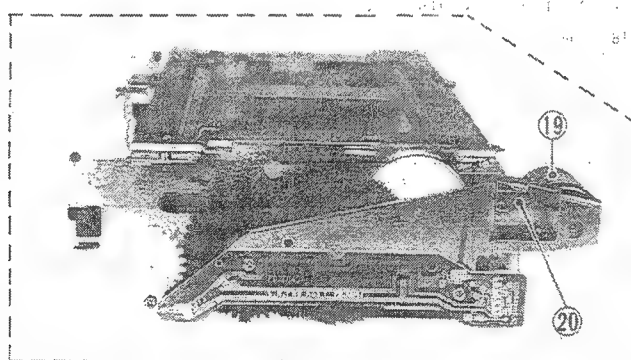


Fig. 2-1-3 Cassette housing

1. Supply guide roller
2. Supply slant pole
3. Tension arm assy
4. Upper drum assy
5. Take-up slant pole
6. Take-up guide roller
7. A/C head
8. Pinch roller arm assy
9. Take-up guide pole
10. Guide arm assy

11. Capstan shaft
12. Take-up reel disk
13. Idler arm
14. Tension band assy
15. Supply reel disk
16. Lower drum assy
17. Impedance roller
18. Full erase head
19. Cassette motor
20. Cassette belt

21. Capstan motor
22. Reel motor
23. Mode motor
24. Mode belt
25. Roller assy
26. Half loading arm assy
27. Brush assy

#### 2.1.4 Main parts replacement table

Periodic inspection and maintenance are needed in order to ensure performance and reliability. The following table has been compiled simply to give a general idea regarding maintenance and inspection. In practice, the periods indicated will vary widely according to environmental and usage

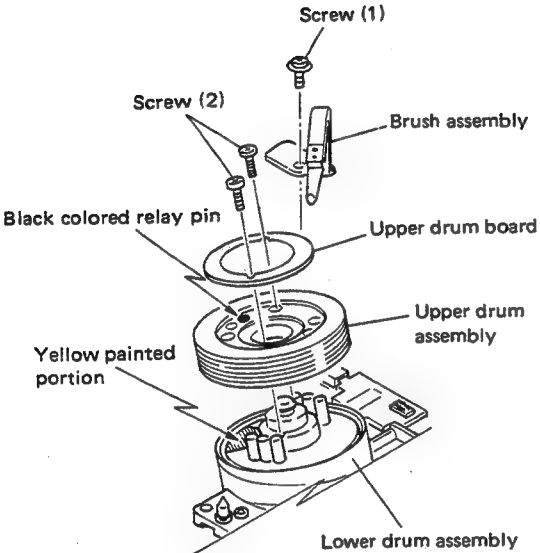
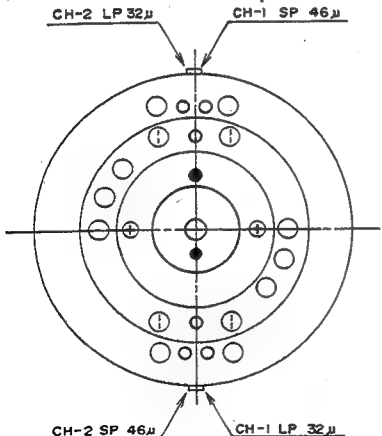
conditions. Also be aware that rubber parts may deform and age even when the equipment is not used. The upper drum life is particularly affected by environmental and usage conditions.

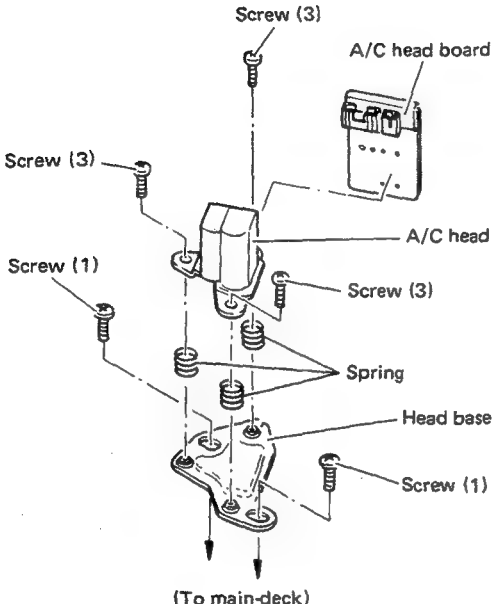
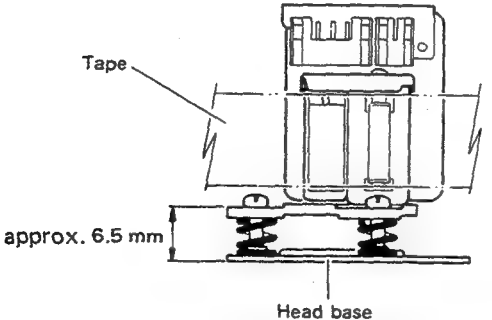
No.	Parts Name	Parts No.	Periodic servicing schedule (operating hours)								Ref. sect.	Remarks
			1000	2000	3000	4000	5000	6000	7000	8000		
Tape transport system												
1	Tension pole ass'y	PQ43710A	★	★	★	★	★	★	★	★	Perform cleaning with finely woven cloth or gauze moistened in alcohol.  Confirm that the cleaned locations are thoroughly dry before operating the deck.  For lubrication, use sewing machine oil or good quality spindle oil.  After cleaning with alcohol, apply 1 or 2 drops of oil.	
2	Supply slanted pole	Ass'y No.	★	★	★	●	★	★	★	●		
3	Supply guide roller	PU60556-1-2	★	★	★	●	★	★	★	●		
4	Impedance roller	PQ41955	★	★	★	●	★	★	★	●		
5	Take-up guide pole	PU53629-3	★	★	★	○	★	★	★	●		
6	Capstan shaft	—	★	★	★	★	★	★	★	★		
7	Take-up guide roller	Ass'y No.	★	★	★	●	★	★	★	●		
8	Take-up slanted pole	PGZ01143	★	★	★	★	★	★	★	●		
9	Lower drum ass'y	PDM2035V-23	★	★	★	●	★	★	★	●		
10	Upper drum ass'y	PDM2170A	○	●	○	●	○	●	○	●		
11	Full erase head	PU60646	★	★	★	★	★	★	★		2.2.1	
12	A/C head	PU60560-2	★	★	★	●	★	★	★	●	2.2.2	
13	Pinch roller arm ass'y	PQ42006B	★	★	★	●	★	★	★	●	2.2.4	
Driving system												
14	Capstan motor	PGZ01300	★	○	★	●	★	○	★	●		
15	Reel motor	PGZ01332		●		●		●		●		
16	Mode motor	PQ41996B				○				●		2.2.7
17	Mode belt	PQM30003-20		○		●		○		●		2.2.7
18	Cassette motor	PQ42385A				○				●		
19	Cassette belt	PQM30003-19		○		●		○		●		
20	Idler arm	PU58645-1-4	★	●	★	●	★	●	★	●		2.2.6
21	Supply main brake	PQ42019B-6				○				●		2.2.6
22	Take-up main brake	PQ42020B				○				●		2.2.6
23	Take-up sub brake	PQ42037A-2				○				●		
24	Supply sub brake	PQ42021A-3				○				●		
25	Supply reel disk	PU59250-1-2		△		△		△		△		
26	Take-up reel disk	PU58638-1-2		△		△		△		△		
Others												
27	Brush ass'y	PDM4015B				●				●	2.2.1	←Perform back tension check
28	Tension band	PQ41948A		○		●		○		●	2.2.3	
29	Head cleaner	PRD40510-01-02	●	●	●	●	●	●	●	●		

(★ = Cleaning. ○ = Check, or replace if necessary. ● = Replacement. △ = Lubricate.)

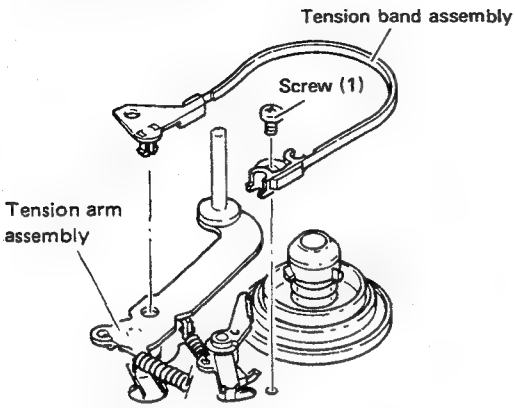
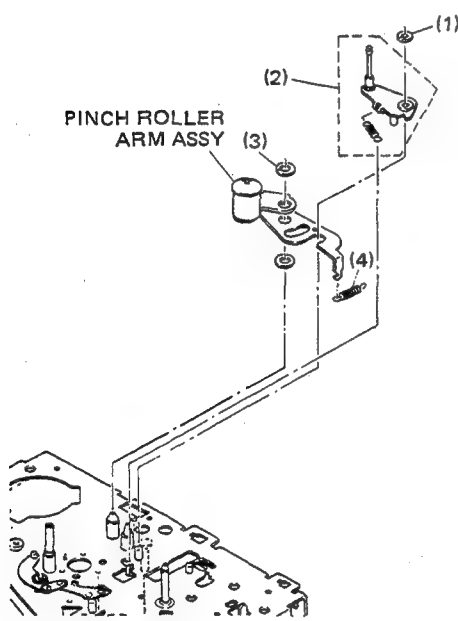
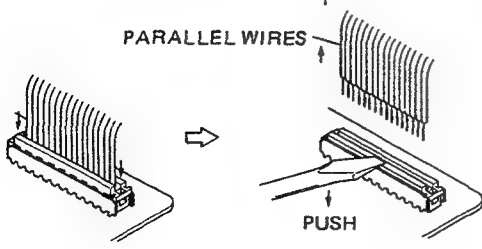
Table 2-1-2 Main parts maintenance and replacement standard

## 2.2 MAIN ASSEMBLY REPLACEMENT

No.	Item	Adjustment parts	Operating mode	Description
1	Upper drum assembly  — Removal —			<p><b>Note:</b> When installing the new upper drum, use care not to touch the video heads. If heads are soiled, clean with a soft, finely woven cotton cloth or chamois that has been moistened in alcohol. Hold lightly against the heads and turn the drum clockwise. By no means clean with a vertical stroke.</p> <ol style="list-style-type: none"> <li>1) Refer to Fig. 2-2-1. Take out screw (1) and remove the brush assembly.</li> <li>2) Use a desoldering tool or desoldering braid to unsolder the upper drum boards.</li> <li>3) Take out two screws (2) and raise the upper drum to remove it together with the upper drum board. (If this drum is to be re-installed, use care not to touch or damage the heads.)</li> </ol>
	— Installation —	 <p>Fig. 2-2-1 Upper drum assembly</p>		<ol style="list-style-type: none"> <li>1) Refer to Fig. 2-2-1. Align the black relay pin of the new upper drum with the yellow marking of the lower drum.</li> <li>2) Reinsert screws (2) and tighten them in a balanced manner.</li> <li>3) Reinstall and solder the upper drum boards.</li> <li>4) Clean the drum assemblies (see above note).</li> <li>5) Reinstall the brush assembly and secure with screw (1).</li> </ol>
	— Checks and adjustments —			<p>After installing the upper drum, perform the following checks and adjustments (refer to appropriate Sections of this Manual).</p> <ol style="list-style-type: none"> <li>1) FM waveform (Section 2.6.1)</li> <li>2) Servo circuit (Section 3.4)</li> <li>3) Video circuit (Section 3.7, 3.5)</li> </ol>

No.	Item	Adjustment parts	Operating mode	Description
2	<p>A/C head (Audio/Control head)</p> <p>— Removal —</p>  <p>(To main-deck)</p> <p>Fig. 2-2-2 A/C head</p>			<ol style="list-style-type: none"> <li>1) Disengage connectors attached to the A/C head board.</li> <li>2) Take out two screws (1) and remove the A/C head together with the head base.</li> <li>3) Unsolder and remove the A/C head board from the A/C head.</li> <li>4) Take out three screws (3) and remove the A/C head from the head base. Use care regarding the three springs.</li> </ol>
	<p>— Installation —</p>  <p>approx. 6.5 mm</p> <p>Fig. 2-2-3 A/C head height</p>			<ol style="list-style-type: none"> <li>1) Install the A/C head by reversing the removal steps of above.</li> <li>2) Temporarily set the A/C head height above the head base for 6.5 mm (see Fig. 2-2-3).</li> </ol>
	<p>— Checks and adjustments —</p>			<ol style="list-style-type: none"> <li>1) Use a spare tape (not Alignment tape) and confirm proper operation of the tape transport (see Section 2.5).</li> <li>2) Perform interchangeability adjustment (see Section 2.6).</li> </ol>



No.	Item	Adjustment parts	Operating mode	Description
3	Tension band assembly	 <p>Fig. 2-2-4 Tension band assembly</p>		<ol style="list-style-type: none"> <li>1) Take out screw (1) and disengage the tension band assembly from the tension arm assembly (see Fig. 2-2-4).</li> <li>2) Remove and replace the tension band assembly.</li> <li>3) Perform tension pole position adjustment (see Section 2.4).</li> </ol>
4	Pinch roller arm assembly	 <p>Fig. 2-2-5 Pinch roller assembly</p>		<ol style="list-style-type: none"> <li>1) Take out a slit washer (1) and remove the guide arm assembly (2).</li> <li>2) Take out a slit washer (3) and the tension spring (4).</li> <li>3) Remove and replace the pinch roller arm assembly.</li> <li>4) Secure with a new slit washer (3) (PQM30017-28).</li> <li>5) Reassemble by reversing the above steps.</li> </ol>
5	PARALLEL WIRES	 <p>Fig. 2-2-6</p>		<ol style="list-style-type: none"> <li>1) Press the clamp as shown and remove the wires.</li> </ol>

No.	Item	Adjustment parts	Operating mode	Description
6	Reel motor and idler arm			<ol style="list-style-type: none"> <li>1) Disengage the main brake assembly first, by using pliers, pull out one to straight up to remove them.</li> <li>2) Disengage the spring (1) from the idler arm and move the idler arm in the direction of the arrow to remove it.</li> <li>3) Unsolder the wire from reel motor.</li> <li>4) Take out two screws (2) and replace the reel motor assembly.</li> <li>5) Reassemble by reversing the above steps.</li> </ol>
7	Mode motor assembly			<ol style="list-style-type: none"> <li>1) Refer to Fig. 2-2-8. Take out two screws (1) and raise the relay board assembly.</li> <li>2) Take out three screws (2) securing the cam bracket sub-assembly to the main deck.</li> <li>3) Unsolder the wire from mode motor.</li> <li>4) Take out two screws (3) and replace the mode motor assembly. Reassemble by reversing the above steps.</li> <li>5) Engage the rubber belt with the pulley.</li> </ol>

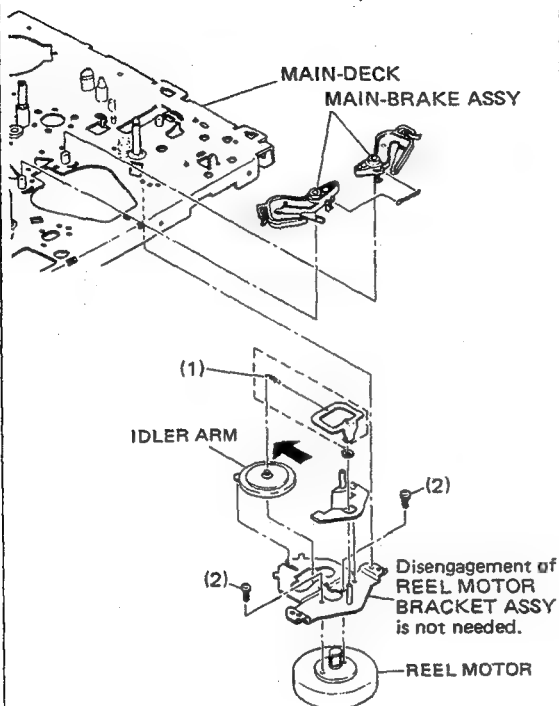


Fig. 2-2-7 Reel motor and idler arm

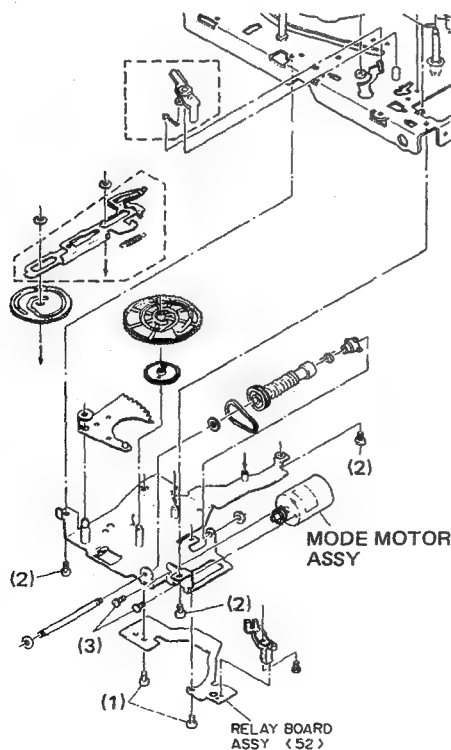
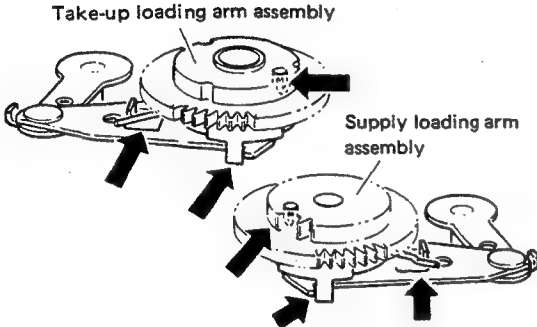
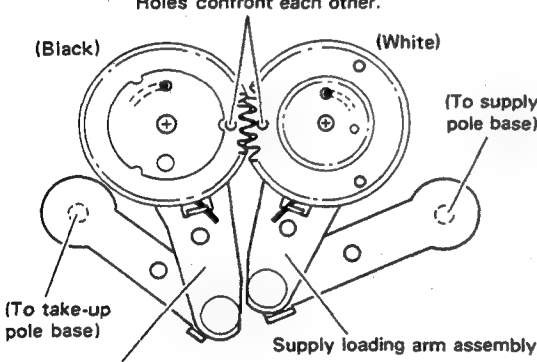


Fig. 2-2-8 Mode motor assembly

## 2.3 ASSEMBLY PROCEDURE OF MECHANISM

No.	Item	Adjustment parts	Operating mode	Description
1	<p>A close relationship exists between the mode select switch and the mechacon circuit. Therefore, the mode select switch and control arm engagement determines the overall mechanical operations of the levers, gears, rollers, etc. If these parts are not properly positioned, the video deck becomes stalled in the unloading or Stop mode.</p>			<p>These assemblies are comprised of loading gears, torsion springs and loading arms.</p> <p>1) Refer to Fig. 2-3-1 and install the loading arm assemblies correctly.</p> <p>2) The take-up and supply loading arm positions with respect to the loading gear holes are indicated in Fig. 2-3-2. This configuration is important to allow shifting to the next operation.</p>
	<p>Loading arm assemblies</p>  <p>Fig. 2-3-1 Loading arm assembly</p>  <p>Fig. 2-3-2 Bottom view of loading arm assembly</p>			

No.	Item	Adjustment parts	Operating mode	Description
2	Control cam			<p>1) Install the half loading cam on the cam bracket assembly, then mount the slide cam plate assembly so that its stud sets into the groove on the half loading cam.</p> <p>2) Install the arm gear assembly on the cam bracket assembly.</p> <p>3) Assemble the second gear and the control cam so that the stud of the control cam sets into the hole of the second gear.</p> <p>4) Mount the above assembly (control cam and second gear) on the cam bracket assembly to satisfy the relation indicated in figure.</p> <p>5) Do not turn the control cam from this position for the next step as shown 2.3.3 Cam bracket assembly.</p>
3	Cam bracket assembly			<p>1) Refer to Fig. 2-3-4 and press the plate assembly toward the right to overlap the indicated holes with that of the main deck.</p> <p>2) Then install the cam bracket assembly.</p> <p><b>Note:</b> If the arm and loading gears do not mesh properly, use a jeweler's screwdriver or similar tool to engage the gear teeth while installing the cam bracket assembly.</p>
4	Mode switch position			<p>1) Engage the plate assembly and mode switch as shown in Fig. 2-3-5. Partially tighten screw (1) to where the switch can still be shifted for adjusting the position.</p> <p>2) Press the plate assembly toward the right to where the holes are overlapped as in Fig. 2-3-4. Insert a jeweler's screwdriver into the holes to keep them aligned.</p> <p>3) Shift the mode switch to align the V-notch as indicated in Fig. 2-3-5. Then tighten screw (1) to secure.</p> <p>4) Remove the jeweler's screwdriver, then reinstall and solder the circuit board.</p>

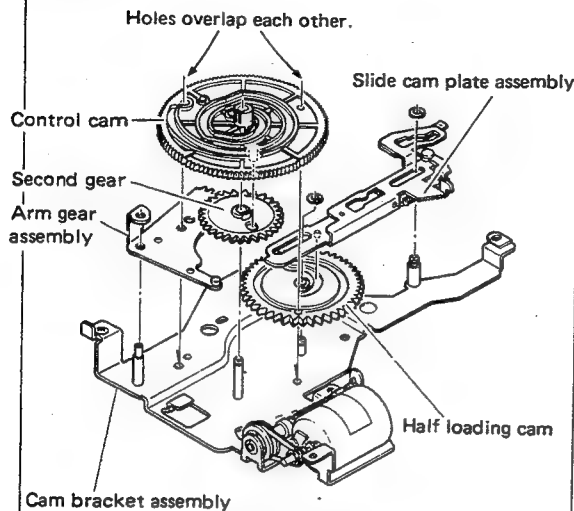


Fig. 2-3-3 Control cam

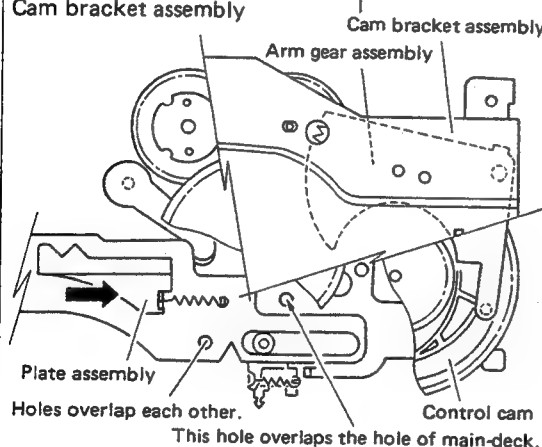


Fig. 2-3-4 Cam bracket assembly

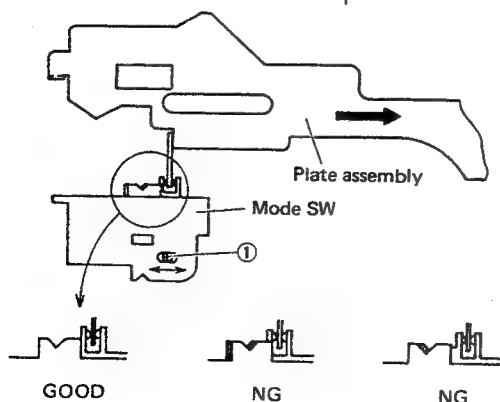
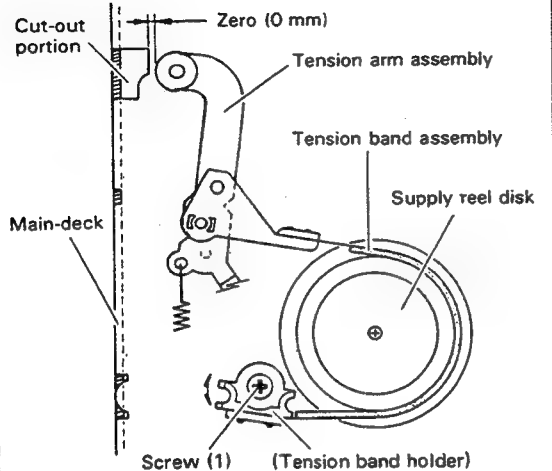


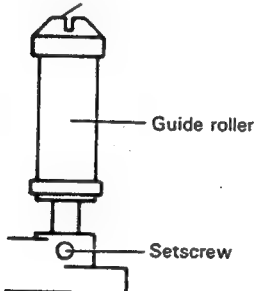
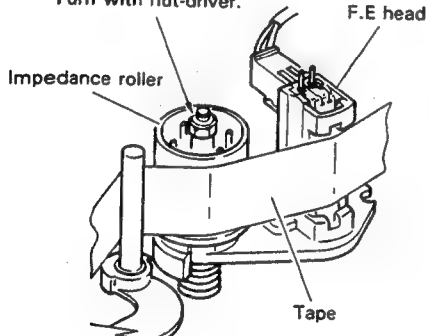
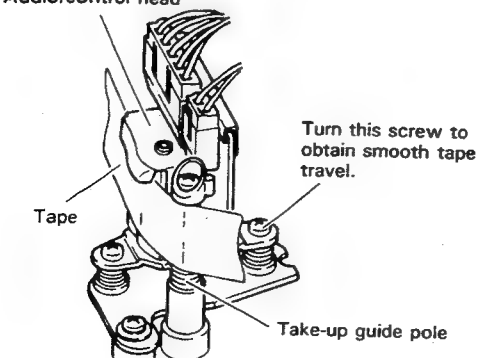
Fig. 2-3-5 Mode switch

## 2.4 CONFIRMATION AND ADJUSTMENT

No.	Item	Adjustment parts	Operating mode	Description
1	Tension pole position   <p>Fig. 2-4-1 Tension pole position</p>			<ol style="list-style-type: none"> <li>1) Without a cassette housing, set for the Play mode (see Section 2.1.1).</li> <li>2) Refer to Fig. 2-4-1. Slightly loosen screw (1). Adjust the tension band holder position for 0 mm separation between the tension arm and cutout position.</li> <li>3) Tighten screw (1) to secure the tension band holder.</li> <li>4) Use the cassette torque meter and set for the Play mode.</li> <li>5) Check for a scale reading between 28 and 42.</li> <li>6) If outside this range, clean the tension band contacting portions of the supply reel disk with alcohol, or check the condition of the tension arm spring. If necessary, replace the tension band assembly.</li> </ol>
2	Take-up torque			<ol style="list-style-type: none"> <li>1) Use the cassette torque meter and set for the Play mode.</li> <li>2) Confirm a value between 45 and 155.</li> <li>3) If outside this range, clean the rubber portion of the idler arm with alcohol, if necessary, or check the reel motor drive circuit.</li> </ol>



## 2.5 TAPE TRANSPORT CHECKS AND ADJUSTMENT PREPARATIONS

No.	Item	Adjustment parts	Operating mode	Description
	<p>The tape transport system has been precision-adjusted at the factory and ordinarily does not require readjustment. However, adjustment may become necessary after long term usage or after replacing parts that affect the tape transport. The following steps mainly cover preparations for the interchangeability adjustments of Section 2.6.</p>			
1	Guide roller			<p>1) During interchangeability adjustments, the guide roller is turned with a flat-blade screwdriver to adjust its height and correct FM waveform linearity. Use a metric hex key (1.25 mm) to slightly loosen the setscrew at the base of the guide roller (see Fig. 2-5-1). Loosen the setscrew just sufficiently to allow the guide roller to be turned. If too loose, tape transport will be too unstable to permit correct adjustment.</p>
	<p>Turn with screw-driver.</p>  <p>Fig. 2-5-1 Guide roller</p>			
2	Impedance roller			<p>1) This compensates for tape running stability between the cassette and head drum. After adjusting the supply guide roller, the impedance roller height is adjusted for smooth tape transport at the lower flange.</p> <p>2) Use a metric nutdriver (5.5 mm) to adjust by turning the upper nut (see Fig. 2-5-2). However, note that excess turning can disturb the FM waveform stability.</p>
	<p>Turn with nut-driver.</p>  <p>Fig. 2-5-2 Impedance roller</p>			
3	A/C head (audio/control head)			<p>1) After adjusting the take-up guide roller, adjust the A/C head inclination for smooth tape travel at the lower flange of the take-up guide pole. Refer to Fig. 2-5-3.</p>
	<p>Audio/control head</p>  <p>Fig. 2-5-3 A/C head</p>			

## 2.6 INTERCHANGEABILITY CHECKS AND ADJUSTMENTS

No.	Item	Adjustment parts	Operating mode	Description
	Before using costly Alignment tape, use a spare tape and confirm correct operation of the tape transport.			
1	FM waveform			<p>1) Connect an oscilloscope to TP4 of the video PRE/REC board [4] [3]. Trigger the oscilloscope externally with the signal from TP7 of the D/C board [0] [5].</p> <p>2) Playback the MHPE Alignment tape and adjust the tracking for maximum FM waveform output. Refer to Fig. 2-6-1. Confirm the relationships indicated in the figure for maximum output (a), minimum center output (b), minimum output at the drum intake (c) and minimum output at the drum output (d).</p> <p>3) Adjustment is required if the above specifications are not fulfilled. Even when these are fulfilled, check that the FM waveform varies linearly overall. If not, slight deviation in tracking will cause a large proportional level drop to result in noise appearing in the picture. Therefore, in this condition, proceed to the following checks and perform adjustments where necessary.</p> <p>4) Operate the tracking adjustment between minimum and maximum outputs of the FM waveform. Observe the portion of the waveform corresponding to the drum intake (see Fig. 2-6-2). As the tracking is adjusted, although the gain may increase or decrease, the geometric shape of this part of the waveform should remain consistent. If the shape varies, as shown by the incorrect examples in the figure, carefully perform adjustment of the supply guide roller height.</p> <p>5) Next observe the portion of the waveform corresponding to the drum output (see Fig. 2-6-3), while operating the tracking adjustment. This should also vary only in gain, but not in shape. If the shape varies, as shown by the incorrect examples in the figure, carefully perform adjustment of the take-up guide roller height.</p> <p>6) Check the overall FM waveform. Fine-adjust both guide rollers so that variation is as minimum and linear as possible.</p> <p>7) Observe the tape travel at the guide rollers and guide poles. Confirm absence of tape creasing or curling. Confirm that the tape properly rides at the lower flange of the supply guide pole. Carefully adjust the guide pole height if necessary. This adjustment is important and affects FM waveform response. If creasing or curling is observed at the take-up guide pole, carefully adjust the audio/control head inclination so that the tape rides properly at the lower flange of the guide pole. Finally, again check the FM waveform.</p>

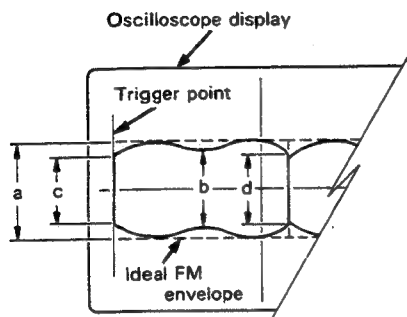


Fig. 2-6-1 FM envelope

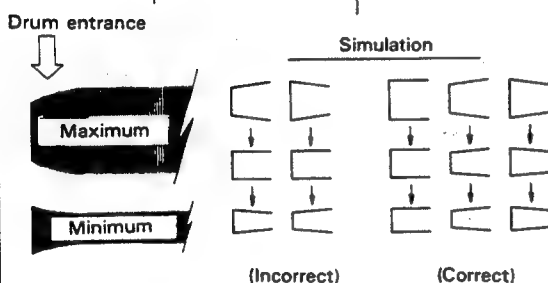


Fig. 2-6-2 Drum entrance

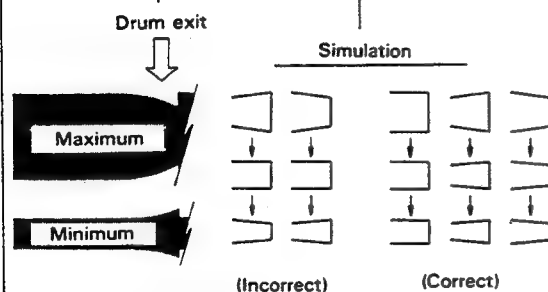
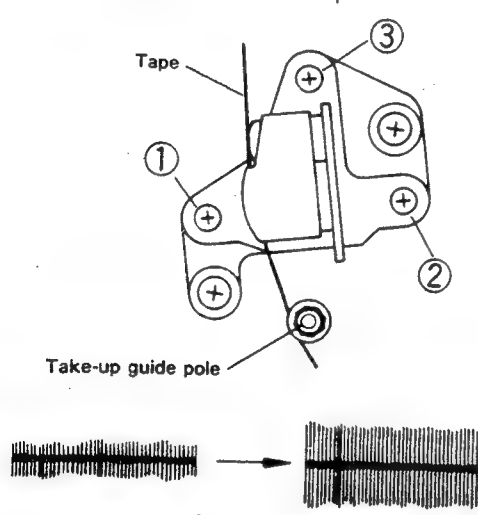
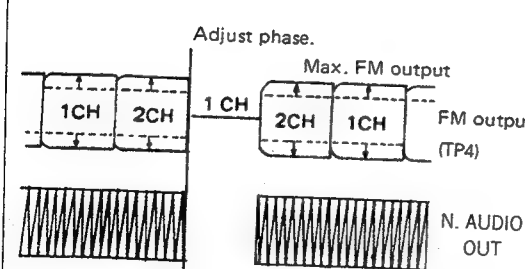


Fig. 2-6-3 Drum exit

No.	Item	Adjustment parts	Operating mode	Description
	<p>Proper adjustment of the A/C head position is important for ensuring adequate audio output and S/N. Severe misalignment can prevent control signal pick-up and cause servo instability. Precise adjustment is particularly important for models that include tape indexing and addressing features, since these rely on control signal coding for operation. To observe the audio signal, connect an oscilloscope to the test point (AUDIO OUT) of the audio circuit, or directly to the audio output terminal. In some cases, monitoring the sound with headphones may be helpful.</p>			
2	A/C head adjustments	 <p>Fig. 2-6-4 A/C head</p>		<ol style="list-style-type: none"> <li>1) Playback the MHPE Alignment tape.</li> <li>2) Adjust screw (3) (Fig. 2-6-4), which is the azimuth adjustment, for maximum output.</li> <li>3) Turn screws (1), (2) and (3) by small and equal increments (about 45° at a time) to adjust the A/C head height for maximum audio output. Slightly raise and lower the height to confirm the maximum output position.</li> <li>4) Observe the FM waveform and tighten the guide roller set-screws. Use care not to disturb the height adjustments. Then again confirm the FM waveform is not affected.</li> </ol>
	<p>When X-value is incorrectly adjusted, it results in time lag between reproduced image and sound when tape recorded by a VTR whose X-value is correctly adjusted is played back. This is more clearly observed in LP PB mode than the standard PB mode.</p> <p>Connect a probe of an oscilloscope to a test point (TP4 or TP3 [for LP mode] on the PRE/REC board) on the video PB circuit and the other probe to the NORMAL AUDIO OUT for observing FM waveform. In addition, set the tracking control to the center position.</p>			
3	Control head phase (X-value)	 <p>Fig. 2-6-5 Interchangeability Control head phase adjustment</p>		<ol style="list-style-type: none"> <li>1) Play back the MBPE-X alignment tape.</li> <li>2) Slightly loosen the screws ④ and ⑤ of the A/C head, and put the A/C head positioning jig (PUJ47351-2) on the screw ④ while inserting the jig's pin into the hole nearby the screw. (See Fig. 2-6-4.)</li> <li>3) Adjust the position of the A/C head so that both phases of audio waveform and FM waveform coincide with each other in the non-recorded part and the FM output becomes nearly the maximum.</li> <li>4) Remove the positioning jig and then tighten the screws ④ and ⑤.</li> <li>5) Play back the MHPE alignment tape, and adjust the tracking control while confirming the maximum FM waveform at the center click position.</li> <li>6) When the FM waveform is not maximum with the tracking control set at the center position in playback of the MHPE alignment tape, move the A/C head to FM MAX position nearest the position obtained in the above step 3).</li> <li>7) Play back the MHPE-L alignment tape.</li> <li>8) Adjust R60 (DC Servo board) to maximize so that the FM output level.</li> </ol>

No.	Item	Adjustment parts	Operating mode	Description
4	Final checks			<p>1) Input video signal (B/W signal is preferable) to record it, and play it back to confirm that the PB waveform meets the standard of video FM waveform (see Fig. 2-6-1). Perform this check both in the standard and LP PB modes.</p> <p>2) Referring to the Section 3 Electrical Adjustment, proceed to check and adjust the servo circuit, video circuit and audio circuit totally.</p>

## SECTION 3 ELECTRICAL ADJUSTMENTS

### 3.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts.

It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

#### 3.1.1 Required test equipment

1. Color television or monitor
2. Oscilloscope: wide-band, dual-trace, triggered delayed sweep
3. Frequency counter
4. Audio tester
5. Digital voltmeter
6. Signal generator: PAL color bar, staircase, video sweeper
7. Recording tape
8. Alignment tape: MHPE, MH-2, MHVE-2, MHAЕ
9. Head resonance adjust coil: PTU94004A
10. RF sweep signal generator (100 kHz – 10 MHz)

#### 3.1.2 Check and adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

<b>No.</b>	Checks and adjustments are numbered in the recommended sequence in which they are to be performed.
<b>Item</b>	Name assigned to the particular check and adjustment step.
<b>Check Point</b>	Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.
<b>Adjustment Parts</b>	Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (—) indicates check only.
<b>Signal &amp; Mode</b>	<ul style="list-style-type: none"> <li>• Input signal required to perform adjustment. Dash (—) indicates that special signal is not required.</li> <li>• Equipment operating mode at time of check or adjustment.</li> </ul>

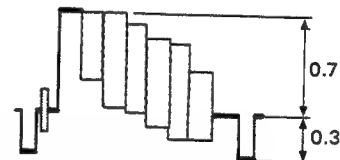
Color bar	Color bar signal as video input.
Stairstep	Stairstep signal as video input.
1 kHz	1 kHz sinewave as audio input signal.
E-E	Power on and machine in Stop mode.
REC	Recording mode
PB	Playback mode
SLOW	Slow motion playback mode
STILL	Pause during playback mode
VHS mode	VHS SP mode
VHS mode	VHS LP mode
TIME LAPSE mode	24, 72, 120, 240, 480, 960 H mode

**Description** This column provides an explanation of the step, notes and adjustment values.

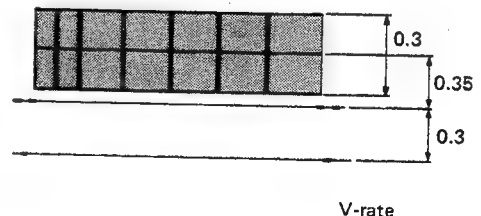
**Note:** Unless otherwise noted, supply a VIDEO signal to LINE IN (BNC connector).

#### 3.1.3 Required test signal

- EBU 75% colour bars



- Video sweep (100 kHz – 5 MHz)



- Sweep





### 3.1.4 Alignment tape specifications

#### ● MH-8

No.	PB time	Video signal	Audio signal	Description
1	2 min.	Colour sweep	400 Hz (−10 dB)	for check and adjustment of frequency characteristic in video PB circuits for check and adjustment of frequency characteristic in audio PB circuits
2	2 min.	"	100 Hz (−10 dB)	
3	2 min.	"	8 kHz (−10 dB)	
4	4 min.	"	—	

#### ● MHPE

Video signal	Audio signal	Description
VHS SP mode Stairstep	6 kHz	for check and adjustment of interchangeability for check and adjustment of the servo circuit for adjustment of audio head azimuth
		Usable in place of MH-2 stairstep

#### ● MHVE-2

Video signal	Audio signal	Description
VHS SP mode Colour bars	—	for check and adjustment of video signal PB circuits
		Usable in place of MH-2 colour bars

#### ● MHAЕ

Video signal	Audio signal	Description
—	1 kHz (0 dB)	for check and adjustment of audio signal PB circuits
		Usable in place of MH-2 1 kHz signal

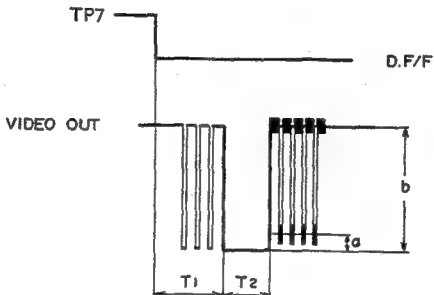
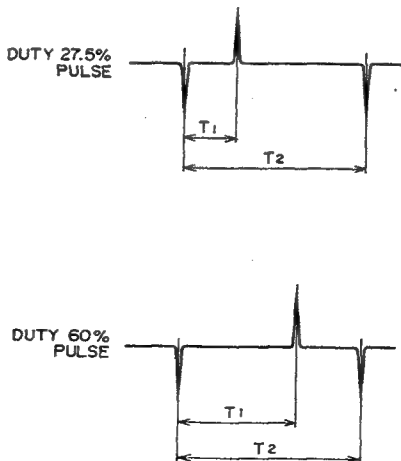
### 3.1.5 Factory switches setting

#### ● Front side

ON SCREEN BRIGHT : Center  
 SHARPNESS : Center  
 BUZZER : OFF  
 AUTO REC : OFF  
 ALARM REC : OFF  
 REPEAT REC/PLAY : OFF  
 ON SCREEN : ON  
 VIDEO MODE : AUTO

#### ● Rear side

V. PULSE : OFF  
 DIP SW (1, 3 — 8) : ON  
 DIP SW (2) : OFF

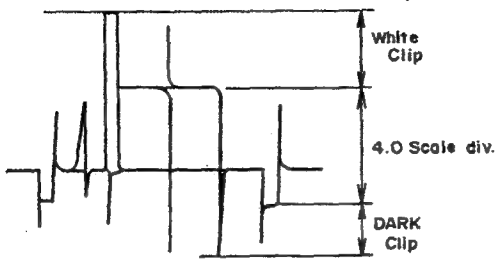
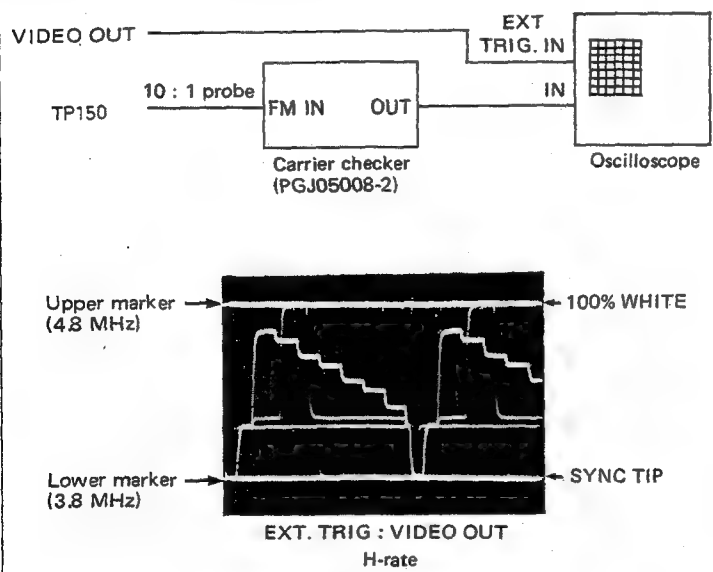


No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description
4	V. pulse check	TP7 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">5</span> VIDEO OUT (75-ohm terminated)	—	MHVE-2	Search (X 2)	<ol style="list-style-type: none"> <li>1) Connect the oscilloscope to TP7 (D. FF) <span style="border: 1px solid black; padding: 0 2px;">0</span><span style="border: 1px solid black; padding: 0 2px;">5</span> for external trigger (— slope).</li> <li>2) Change the initial setting of the following switch. V. PULSE SW : ON</li> <li>3) Play back the alignment tape MHVE2 in the Search mode.</li> <li>4) In the left figure, where, 'T<sub>1</sub>' is the pulse width between the falling point of D. FF (TP7) and that of the V. pulse of the VIDEO OUT, 'T<sub>2</sub>' is the width of the V. pulse, and 'a' and 'b' interpret the waveform of the VIDEO OUT, confirm the following things. <ul style="list-style-type: none"> <li>T<sub>1</sub> = 290 ± 30 μsec</li> <li>T<sub>2</sub> = 190 ± 20 μsec</li> <li>a = 0 ± 30 mV</li> <li>b = 290 ± 40 mV</li> </ul> </li> </ol>
					PB	<ol style="list-style-type: none"> <li>5) Change the initial setting of the following switch. V. PULSE SW : OFF</li> <li>6) Play back the alignment tape, and confirm that there is no V. pulse generated in waveform of the VIDEO OUT.</li> <li>7) Change the initial setting as follows. V. PULSE SW : ON</li> <li>8) Play back the color bar segment of the alignment tape, and confirm that there is the same V. pulse as observed in the step 4) impressed.</li> <li>9) Change the setting of the V. PULSE SW to OFF.</li> </ol>
5	Index check	TP3 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">5</span>	—	Color bar	REC ↓ PB	<ol style="list-style-type: none"> <li>1) Connect the oscilloscope to TP7 (D. FF) <span style="border: 1px solid black; padding: 0 2px;">0</span><span style="border: 1px solid black; padding: 0 2px;">5</span> for external trigger.</li> <li>2) Change the initial setting as follows. REC MODE SW : TL 24H ALARM REC SW : ON</li> <li>3) Record the color bar signal.</li> <li>4) In the recording, shortcircuit the ALARM terminal.</li> <li>5) Play back the recorded tape from the recording start point. Observing the waveform and assuming that T<sub>2</sub> = 10 (see the figures on the left), confirm that T<sub>1</sub> = 2.5–3.0 (27.5 ± 2.5%) in the period of 2 sec after the shorting of the ALARM terminal.</li> <li>6) In the period that 2 sec have passed after the switching of the mode, confirm that T<sub>1</sub> = 5.5–6.5 (60 ± 5%) on condition that T<sub>2</sub> = 10.</li> </ol>
						

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description
6	Capstan FG duty adj.	TP3 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span> TP4 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span>	R10 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span> R4 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span>	Color bar	REC	<p>1) Connect the oscilloscope to TP3 and adjust R10 so that the waveform shown on the left meets the following specifications.</p> <p style="margin-left: 40px;"><math>a = 5.0 \pm 0.5 \text{ V}</math> <math>b = b' \text{ (} 50 \pm 5\% \text{ duty)}</math></p> <p>2) Connect the oscilloscope to TP4 and adjust R4 for the same purpose of the above step 1).</p> <p><b>Note:</b> If there are fluctuations in the measured values, adjust by the center value respectively.</p>
7	Stop servo level adj.	TP6 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span> TP GND <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span>	R43 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span> R38 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span> R45 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span>	—	REC	<p>1) Connect the oscilloscope to TP6 and set the mode to REC with a E-180 cassette tape loaded.</p> <p>2) Adjust R43 so that a and a' of the waveform of TP6 are equalized with each other (<math>a = a' \text{ [} 50 \pm 5\% \text{]}</math>).</p> <p>3) Alternately adjust R38 and R45 so that the waveform of TP6 meets the following specifications.</p> <p style="margin-left: 40px;"><math>B = 3.0 \pm 0.2 \text{ VDC } \textcircled{R45}</math> <math>C = 6.0 \pm 0.5 \text{ Vp-p } \textcircled{R38}</math></p> <p><b>Note:</b> If there is stepping down/up in the waveform, adjust by the higher level as it is the criterion.</p> <p>If there is fluctuation in the measured value, adjust by the center value.</p>
		TP7 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span> TP GND <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span>	—	—	STOP	<p>4) Connect the oscilloscope to TP7 and confirm no fluctuation in the waveform level. (at the stabilized voltage)</p>
8	Slow F-V converter adjustment	TP8 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span> TP GND ↓ Digital voltmeter	R56 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span>	MHPE	PB	<p>1) Adjust R56 to obtain <math>3.90 \pm 0.05 \text{ V DC}</math> as voltage at TP8.</p>
		<span style="border: 1px solid black; padding: 2px;">TP13 : <math>3.90 \pm 0.05 \text{ V DC}</math></span>				
9	F-V converter center voltage adjustment	TP12 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span> TP GND ↓ Digital voltmeter	R62 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">6</span>	MHPE	PB	<p>1) Adjust R62 to obtain <math>2.5 \pm 0.1 \text{ V DC}</math> as the voltage at TP12.</p>
		<span style="border: 1px solid black; padding: 2px;">TP20 : <math>2.5 \pm 0.1 \text{ V DC}</math></span>				

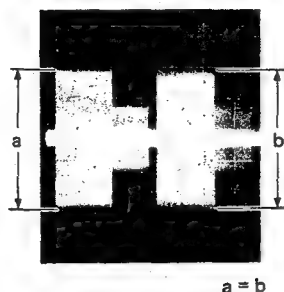
No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description
10	F-V limiter adjustment	TP11 06	R87 06	Color bar	REC (24H)	<p>1) Connect the oscilloscope's CH1 probe to TP11.</p> <p>(Trigger: INT +, Sweep mode: NORMAL)</p> <p>2) Change the initial switch setting as follows. REC MODE SW : TL 24H</p> <p>3) Adjust R87 so that the width 'a' of the waveform of TP11 becomes 2.8 msec.</p>
11	Tape transport amount adj.	TP1 06 TP3 07	R75 06 R38 06 R45 06	Color bar	REC (24H)	<p>1) Change the initial switch setting as follows. REC MODE SW : TL 24H</p> <p>2) Connect the CH-1 probe of the dual-trace oscilloscope to TP1 while its CH-2 probe to TP3 for external trigger on the pulse (+) slope.</p> <p>3) Confirm that the waveform of TP1 is stabilized 2-3 pulses after the rise point of the TP3's pulse. (<math>2 \pm 1</math> pulses)</p> <p>4) If the condition is out of the step 3), adjust as follows.</p> <ul style="list-style-type: none"> <li>• Number of pulses: Adjust R75 and confirm the steps 5) and 6).</li> <li>• Stability of waveform: Adjust R38 and R45. Confirm the stop servo level adj. (No. 7)</li> </ul> <p>5) Connect the oscilloscope to TP10, TP8 trigger it externally. (+ slope, TP8 05 D/C servo, NORMAL)</p> <p>6) Confirm that the section 'a' of the waveform of TP8 becomes <math>3.2 \pm 0.3</math> V DC. At the same time, confirm that 'b' is <math>1.4 \pm 0.15</math> V DC.</p> <p><b>Note:</b> Perform the adjustment with the beginning of the tape.</p>
						<p>TP8 06 TP10 06</p> <p>Color bar</p> <p>REC (24H)</p>

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description
12	TL REC CTL position	TP1 08 TP2 08	R101 09 R104 09	Color bar	REC TL24H	<ol style="list-style-type: none"> <li>1) Input the color bar signal and record it. REC MODE SW : TL 24H</li> <li>2) Connect the oscilloscope's CH-1 to TP1 and CH2 to TP2.</li> <li>3) Adjust R104 so that 'a' of the waveform is 46 msec. (a = 46 msec) (ext. trigger: TP2, - slope)</li> <li>4) Adjust R101 so that 'b' becomes 15 msec. (b = 15 msec) (Trigger: INT, + slope)</li> </ol>
		<p>TP-1 (T.L.SUB.S)</p> <p>TP-2 (T.L.SUB.S)</p> <p>POSITION WIDTH</p> <p>a b</p> <p>TRIG (OSCILLOSCOPE ⊖ NORM)</p> <p>TP4 43</p> <p>TP7 05</p> <p>3.2 Scale div.</p> <p>4.0 Scale div.</p> <p>TRACKING MAX</p>			PB TL 24H	<ol style="list-style-type: none"> <li>5) Connect the oscilloscope probes to TP4 and TP7.</li> <li>6) Maximize FM level by pressing the TRACKING button. At the same time, the FM level should be adjusted to be 4 scale divisions on the oscilloscope screen.</li> <li>7) Then, press the TRACKING buttons simultaneously for tracking preset, and confirm that the FM level is 3.2 scale divisions or more.</li> <li>8) If not, vary the value 'a' of the above step 3) first and repeat the steps 5) through 7).</li> </ol>
13	TL skew adj.	TP3 08	R106 09 R111 09 R126 09	Color bar	REC TL24H (TL72H)	<p><b>Note:</b> The above-mentioned adjustment should be applied only to the sets whose serial numbers are 1888 and after. For the sets whose serial numbers are 1887 and before, perform the adjustment according to directions in the parentheses.</p> <ol style="list-style-type: none"> <li>1) Connect the oscilloscope to TP3 with external trigger from TP8 (- TRIG, 05 NOR).</li> <li>2) Pick up the Philips pattern and record it on the beginning portion of recording tape. REC MODE SW : TL24H (TL72H)</li> <li>3) Adjust R106 so that T = 15.0 msec while adjust R111 so that A = 3.7 msec.</li> <li>4) Secondly, set the REC MODE switch to TL72H and perform the same recording as the the above.</li> <li>5) Adjust R126 so that A = 3.4 msec.</li> <li>6) Thirdly, set the REC MODE switch to TL24H(TL72H) again, and record the Philips pattern and play it back in the SP mode.</li> <li>7) Set the AFC switch of the TV monitor to NORMAL while the PULSE CROSS switch to ON. Observe the monitor to confirm that it has symmetric horizontal fluctuation in the edge portions of the both sides.</li> <li>8) If not, it deflects rightward by increasing A, while deflects leftward by decreasing A. <b>Note:</b> It tends to deflect rightward as a whole.</li> <li>9) Set Record in the same manner with the REC MODE switch set to TL24(TL72H), and play it back in the SP mode.</li> <li>10) Repeat the above steps 7) and 8).</li> </ol> <p><b>Note:</b> Unless there is particular skew observed in the picture, do not disturb the setting of these VRs. Different skew appears owing to AFC of TV monitor used.</p>
		<p>A T</p> <p>TRIG</p> <p>Oscilloscope: 50 mV/div.</p> <p>VIDEO OUT (TV monitor)</p>			REC TL72H (TL24H) REC TL24H (TL72H) ↓ PLAY SP	

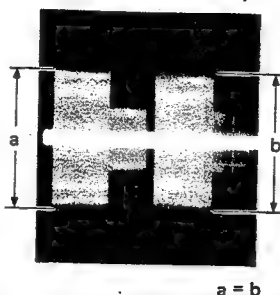


No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description
6	White & Dark clip	TP35 04	—	Pulse & Bar	EE (SP)	<p>1) Connect the oscilloscope to TP35, and adjust the GAIN VR of the oscilloscope so that the level between the 100% white and the sync. tip is 4.0 scale divisions.</p> <p>2) At that time, confirm the following values.</p> <p>A (WHITE CLIP): 3.4—4.0 scale divisions</p> <p>B (DARK CLIP): 1.4—2.2 scale divisions</p>
						
7	Carrier & Deviation	TP50 04	—	Color bar	EE	<p>1) Connect the oscilloscope and the carrier checker as shown in the figure on the left.</p> <p>2) Set the level between the upper marker and the lower marker for 8.0 scale divisions on the oscilloscope screen.</p> <p>3) Confirm that difference of the sync. tip is <math>\pm 0.8</math> scale division to the lower marker.</p> <p>4) Confirm that difference of the 100% white is <math>\pm 0.8</math> scale division to the upper marker.</p>
						
8	Color mode REC FM level	TP6 43	R95 04	Color bar	REC (SP)	<p>1) Record the color bar signal.</p> <p>2) Adjust R95 so that the pedestal level is 3.0 Vp-p.</p>
						
9	B/W mode REC FM level	TP6 43	R214 04	Gray scale	REC (SP)	<p>1) Adjust R214 so that the pedestal level is 3.5 Vp-p.</p>
						

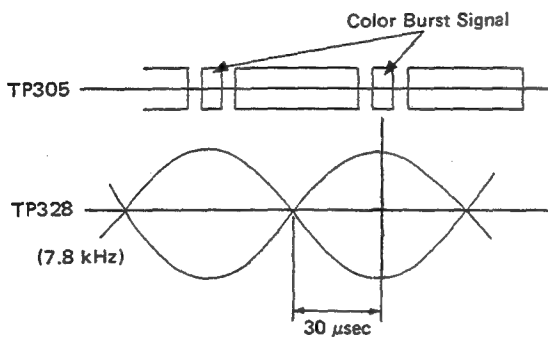
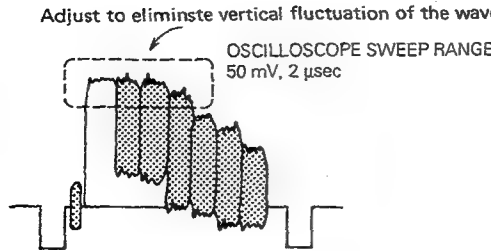
No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description
10	SP mode REC/PB color level adjustment	TP307 <span>0</span> <span>1</span>	—	MHVE-2	PB	<p>1) Play back the MHVE-2.</p> <p>2) Adjust the TRACKING control to maximize the level of the waveform, and assume that the level of a channel having the larger waveform is 'a' as shown in the figure (1 : 1 probe used).</p> <p>3) If the level 'a' is set for 5.0 scale divisions on the oscilloscope screen, confirm that the smaller level 'b' is more than 3.5 scale divisions (channel difference is 3 dB).  <b>Note:</b> Leave the oscilloscope's VR as it was set for the above step.</p> <p>4) Press the both of the TRACKING buttons (+, -) simultaneously for tracking preset.</p> <p>5) Record the color bar signal and play it back to confirm the waveform. If correlation between the waveforms of two channels is the same as that of the step 3), proceed to do the adjustment of the step 6) below. On the other hand, if the correlation is contrary to the above step 3), proceed to do the adjustment of the step 7).</p> <p>6) In case the correlation between the waveforms is the same as that of the step 3):  Adjust R355 so that the level of the larger channel is 5.0 scale divisions (0 dB) to the level 'a' (5.0 scale divisions).</p> <p>7) In case the correlation between the waveforms is contrary to that of the step 3):  Adjust R355 so that the level of the larger channel satisfies the value in accordance with the table on the left.</p> <p>8) In the same manner as in the step 3) above, confirm that the level of the smaller channel is more than 3.5 scale divisions if the level of the larger channel is 5.0 scale divisions.  If the correlation of channel difference between the playback levels of the alignment tape and self-recorded tape is contrary, confirm that the channel difference between the two playback levels is within 3 dB.</p> <p>9) Return the oscilloscope's VR to the original setting position.</p> <p><b>Note:</b> Connect the oscilloscope to TP7 (D. FF) <span>0</span> <span>5</span> for external trigger.</p>
		TP307 <span>0</span> <span>1</span>	R355 <span>0</span> <span>4</span>	Color bar	REC ↓ PB (SP)	



No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description
11	LP mode REC/PB color level adjustment	TP307 0 1	—	MH-2L (Color bar)	PB	<ol style="list-style-type: none"> <li>1) Play back the color bar segment of the alignment tape MH-2L.</li> <li>2) Connect the oscilloscope to TP307 (with 1 : 1 probe used).</li> <li>3) Adjust the TRACKING control to maximize the waveform, and assume that the level of a channel having the larger waveform is 'a' as shown in the figure (measured by respective average values).</li> <li>4) If the level 'a' is set for 5.0 scale divisions on the oscilloscope screen, confirm that the smaller level 'b' is more than 3.5 scale divisions (channel difference is 3 dB).</li> <li>5) Press the both of the TRACKING buttons (+, -) simultaneously for tracking preset.</li> <li>6) Change the initial switch setting as follows. REC MODE SW : LP</li> <li>7) Record the color bar signal and play it back to confirm the waveform. If correlation between the waveforms of two channels is the same as that of the step 4), proceed to do the adjustment of the step 8) below. On the other hand, if the correlation is contrary to the above step 4), proceed to do the adjustment of the step 9).</li> <li>8) In case the correlation between the waveforms is the same as that of the step 4): Adjust R353 so that the level of the larger channel is 5.0 scale divisions (0 dB) to the level 'a' (5.0 scale divisions).</li> <li>9) In case the correlation between the waveforms is contrary to that of the step 4): Adjust R353 so that the level of the larger channel satisfies the value in accordance with the table on the left.</li> <li>10) In the same manner as in the step 4) above, confirm that the level of the smaller channel is more than 3.5 scale divisions if the level of the larger channel is 5.0 scale divisions. If the correlation of channel difference between the playback levels of the alignment tape and self-recorded tape is contrary, confirm that the channel difference between the two playback levels is within 3 dB.</li> <li>11) Return the oscilloscope's VR to the original setting position.</li> </ol> <p><b>Note:</b> Connect the oscilloscope to TP7 (D. FF) 0 5 for external trigger.</p>
		TP307 0 1	R353 0 4	Color bar	REC ↓ PB (SP)	

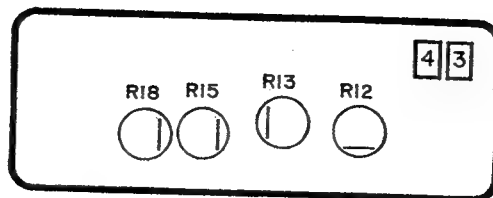


No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description
12	PB Y level adj.	VIDEO OUT	R91 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">4</span>	Color bar	REC ↓ PB (SP)	<ol style="list-style-type: none"> <li>1) In the SP mode, record the color bar signal inputted through the VIDEO IN and play it back.</li> <li>2) Connect the oscilloscope to the VIDEO OUT with 75-ohm terminator and adjust R91 so that the output level is 1.0 Vp-p.</li> </ol>
13	Sharpness preset adj.	TP24 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">4</span>	R42 <span style="border: 1px solid black; padding: 0 2px;">0</span> <span style="border: 1px solid black; padding: 0 2px;">4</span>	B/W sweep	EE (SP)	<ol style="list-style-type: none"> <li>1) Input the B/W sweep signal to the VIDEO IN in the SP mode and set the deck to EE.</li> <li>2) Connect the oscilloscope to TP24, and short-circuit between the emitter and collector of Q17 of the MAIN board with a shorting lead.</li> <li>3) Take note of the frequency response of the 2 MHz signal.</li> <li>4) Remove the shorting lead.</li> <li>5) Adjust R42 to obtain the same signal level as that taken note of in the above step 3).</li> </ol> <p><b>Note:</b> Perform the adjustments with the SHARPNESS VR set at the center position.</p>
14	SP video frequency response	VIDEO OUT	R130 <span style="border: 1px solid black; padding: 0 2px;">4</span> <span style="border: 1px solid black; padding: 0 2px;">3</span>	B/W sweep	REC (SP) ↓ PB (SP)	<ol style="list-style-type: none"> <li>1) Connect the oscilloscope's probe to the VIDEO OUT with 75-ohm terminator.</li> <li>2) Record the signal and play it back both in the SP mode. Confirm that the SHARPNESS control is set at the center position.</li> <li>3) Perform measurement based on the channel having the higher level. When the 100 kHz level is set for 5.0 scale divisions on the oscilloscope, adjust the 2.0 MHz level to be 4.5 scale divisions by R130. At that time, confirm that the level difference between channels is within 2 dB.</li> <li>4) Record the color sweep signal and play it back both in the SP mode.</li> <li>5) Measure in the same channel as the step 3).</li> <li>6) When the 100 kHz level is set for 5.0 scale divisions, confirm that the 2.0 MHz level is 3.9 to 6.0 scale divisions.</li> </ol> <p><b>Note:</b> Measure the frequency response by the center of fine noise outside the noise that is on the 2 MHz marker and has clear contour.</p>
		VIDEO OUT	—	Color sweep	REC (SP) ↓ PB (SP)	

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description
15	LP video frequency response	VIDEO OUT	R131 [4][3]	B/W sweep	REC (LP) ↓ PB (LP)	1) Record the B/W sweep signal and play it back both in the LP mode. Confirm that the SHARPNESS control on the front panel is set at the center position. 2) Perform measurement based on the channel whose level is higher than the other. When the 100 kHz level is set for 5.0 scale divisions on the oscilloscope, adjust the 2.0 MHz level to be 3.5 scale divisions by R131. At that time, level difference between the channels must be within 2 dB.
		VIDEO OUT	—	Color sweep	REC (LP) ↓ PB (LP)	3) Record the color sweep signal and play it back both in the LP mode. 4) Measure in the same channel as the step 2). 5) When the 100 kHz level is set for 5.0 scale divisions on the oscilloscope, confirm that the 2.0 MHz level is 2.8 to 4.5 scale divisions. 6) Again confirm that the SP video frequency response with the B/W sweep signal is correct.
16	APC error phase	TP305 TP328	T301 [0][4]	Color bar	REC (SP) ↓ PB (SP)	1) Connect one channel of a dual trace oscilloscope to TP305 while the other channel to TP328. Trigger the oscilloscope external (— slope) with the signal from TP12 (H. SYNC). (oscilloscope : CHOP MODE) 2) Adjust T301 to position the zero-cross 30 $\mu$ sec $\pm$ 3 $\mu$ sec from the center of the burst signal as shown in the figure. <b>Note:</b> For the above procedure, use a ceramic adjusting tool.
						
17	0.5H delayed video signal	VIDEO OUT (75-ohm terminated)	R9 [0][4] (IC6 Module)	Color bar	REC (LP) ↓ PB (LP) ↓ STILL	1) Connect the oscilloscope to the VIDEO OUT with 75-ohm terminator. 2) Record the color bar signal and play it back both in the LP mode. TRACKING SW : PRESET 3) In the LP Still mode, adjust R9 (inside IC6 Module) not to double the waveform. (Adjust the waveform so that it does not double and has smooth outline. Particularly for the waveform inside the dotted line, set the oscilloscope to 50 mV, 2 $\mu$ sec for measurement.)
						

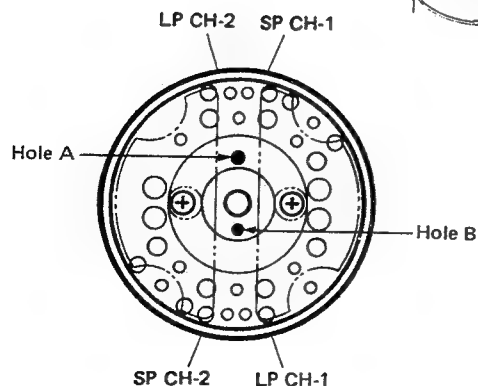
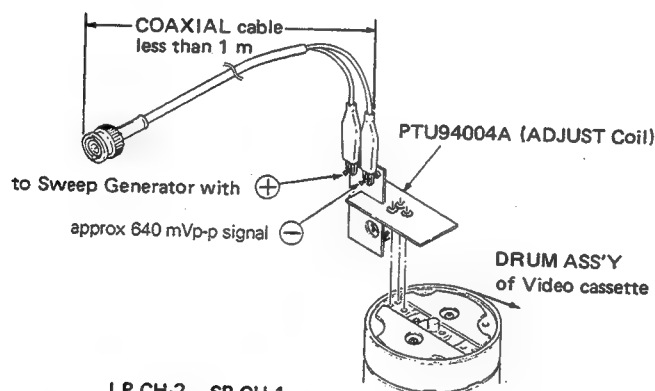
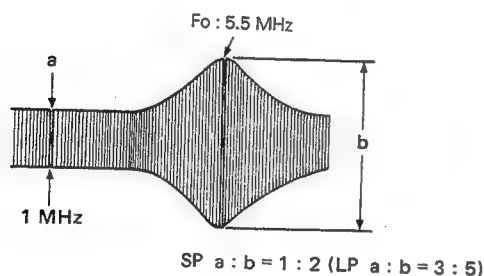
No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description
18	0.25H delayed video signal	VIDEO OUT (75-ohm terminated)	R27 04  R163 04	20T pulse	REC (LP) ↓ PB (LP) ↓ STILL	<ol style="list-style-type: none"> <li>1) Connect the oscilloscope to the VIDEO OUT with 75-ohm terminator.</li> <li>2) Record the signal and play it back both in the LP mode.</li> <li>3) Set to the Still mode. Reduce the 0.25H signal level to be 90% approx. by R27.</li> <li>4) Adjust R163 to maximize the signal level turned down in the step 3).</li> <li>5) Adjust R27 to coincide the VIDEO OUT signal with that of the 0.25H delayed signal.</li> <li>6) Confirm no flickering. If observed, repeat the adjustments of the 0.5H delayed video signal and 0.25H delayed video signal.</li> </ol>

### 3.7 PRE/REC CIRCUIT




No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description
1	Video head resonance & Q (quality factor)	TP4 $\begin{smallmatrix} 4 \\ 3 \end{smallmatrix}$ (SP mode) TP3 $\begin{smallmatrix} 4 \\ 3 \end{smallmatrix}$ (LP mode)	R18 $\begin{smallmatrix} 4 \\ 3 \end{smallmatrix}$ R15 $\begin{smallmatrix} 4 \\ 3 \end{smallmatrix}$ R13 $\begin{smallmatrix} 4 \\ 3 \end{smallmatrix}$ R12 $\begin{smallmatrix} 4 \\ 3 \end{smallmatrix}$	RF sweeper	EE (SP)	<p><b>Note:</b></p> <p>(1) This adjustment is required only after replacing the upper drum (video heads).</p> <p>(2) Connect ground of probe (oscilloscope) to TP1 (GND) of the PRE/REC board.</p> <p>(3) A drum assembly is supported on the deck because of rotation.</p> <hr/> <p>1) Insert a VHS tape and set for the EE mode (VHS-SP mode).</p> <p>2) Connect an oscilloscope to TP4 of the PRE/REC board. Supply a sweeper generator output to adjustment jig as shown in the figure, then adjust the sweeper generator gain so that the waveform does not distort at TP4.</p> <p>3) Trigger the oscilloscope externally with the signal from trigger output (VD) of the sweeper generator.</p> <p>4) Use the control of the oscilloscope to position the 1 MHz region at graduation 3 of the oscilloscope.</p> <p>5) Adjust R11, C64 to position the 5.5 MHz portion at 6 of the oscilloscope graduation as shown in the figure.</p> <p>6) In the same manner, adjust R15, C63 for CH-2 (SP). To change CH-1 and CH-2 of the drum assy with each other, repeat Play and Stop operations to switch the drum FF since it activates CH-1 or CH-2 according to the timing.</p> <p>7) Connect the oscilloscope's probe to TP3, and adjust R13, C62 (LP CH-1) and R12, C61 (LP CH-2) for the LP mode in the same manner as the above steps 1) through 6) for the SP mode.</p> <p><b>Note:</b> In the quality factor adjustment in the condition that <math>a : b = 3 : 6</math>, if there occurs inversion, etc., change the condition so that <math>a : b = 3 : 5</math> and do the adjustment again.</p>

Mode & CH	Direction	Test point	VR (Q)	Fo
SP CH-1	Hole A side	TP4	R18	C64
SP CH-2	Hole B side	TP4	R15	C63
LP CH-1	Hole B side	TP3	R13	C62
LP CH-2	Hole A side	TP3	R12	C61



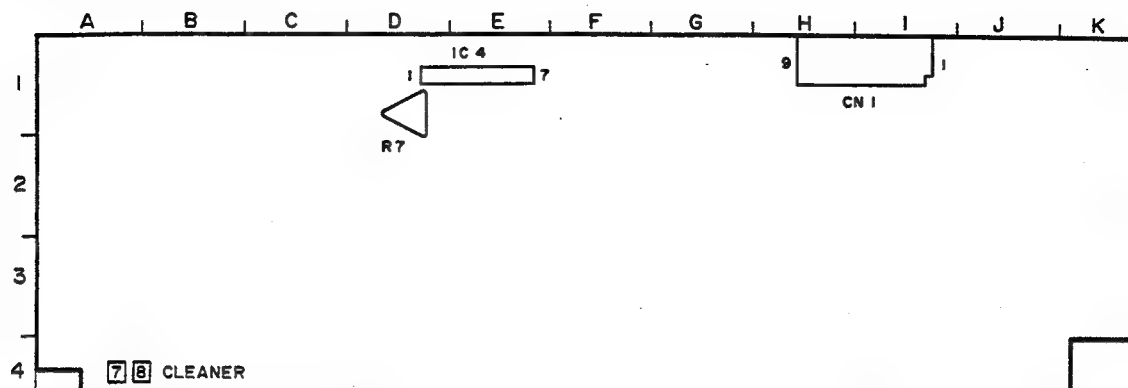


### 3.8 TDG/TIMER CIRCUIT

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description
1	On-Screen position	VIDEO OUT ↓ TV monitor	C6 7 4	Color bar	E-E	1) Connect the TV monitor to the VIDEO OUT terminal. 2) Set the ON SCREEN switch on the front panel to ON. 3) Move the on screen display to the rightmost position in the screen while pressing the ON SCREEN POSITION switch on the front panel. 4) Adjust C6 to position colon between the hour and minute indications on the boundary line between red and magenta of the color bars while observing the TV monitor.
		VIDEO OUT (75-ohm terminated)	TO BRIGHT VR (Front panel)	Color bar	E-E	5) While turning the ON SCREEN BRIGHTNESS control on the front panel, confirm that the brightness of the display changes as the VR is turned. After the confirmation, make sure to reset the BRIGHTNESS VR to the center position.
2	TDG clock adjustment	TP4 7 9 ↓ Frequency counter  <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">TDG CLOCK : 2048.000 ± 0.001 Hz</div> T = 488.2813 ± 0.0002 μsec	C12 7 9	—	E-E	1) Disconnect the AC plug from the outlet. 2) Externally supply 5 V DC to the plus (+) terminal (upper left) of the battery case with grounding to its minus (−) terminal (lower right). 3) Shortcircuit between TP1 and GND with the shorting lead shown below.  4) Shortcircuit between wire of TP2 and GND with the shorting lead to reset the time. 5) Adjust C12 to obtain a frequency of 2048.000 ± 0.001 Hz at TP2. (Cycle check 488.2 μs).

### 3.9 CLEANER CIRCUIT

#### ● CLEANER board (Parts side)



R	7
Location	D1

IC	4
Location	E1

CN	1
Location	I1

No.	Item	Check Point	Adjustment Parts	Signal	Mode	Description
1	Solenoid drive time adjustment	IC4 pin 6	R7	—	PLAY/STOP	1) Connect an oscilloscope to pin 6 of IC4 and adjust R7 so that pulse width "a" becomes 1.0—1.2 sec as shown in the figure.

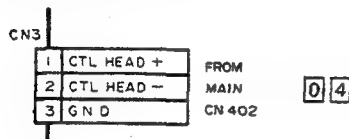
## SECTION 4 DIAGRAMS AND CIRCUIT BOARDS

### ■ FOREWORD

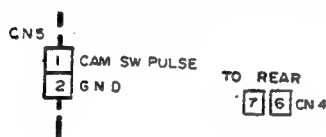
#### 1. Expression of connector

Connector is expressed in the two ways.

1) The following illustrates "CN3 pins 1, 2 and 3".



2) The following illustrates "CN5 pins 1 and 2".



#### 2. Expression of wiring

As the following circuit diagram is divided to print on some sheets, such an indication as the following is found in the case the wiring extends over two or more divided sections.

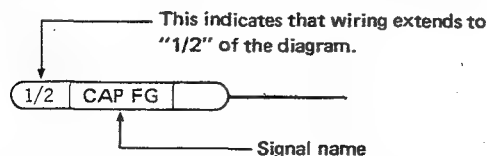
1) Circuit diagram divided into two or more sections:

Board No.	Board Name	Circuit Name
04	MAIN	Y Section COLOR Section AUDIO Section
06	TIME LAPSE SERVO	1/2 Section 2/2 Section
07	MECHACON	2/1 Section 2/2 Section
43	PRE/REC	2/1 Section 2/2 Section

2) Indication of wiring which extends to another section:

(Example)

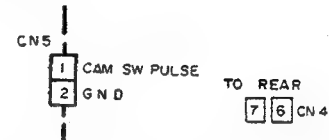
On the "2/2" diagram of MECHACON board, such a indication as the following is found on the CAP FG signal line.



In the above case, the end of the wiring is connected to the "1/2-CAP FG" on the 1st section of the diagram.

#### 3. Wiring of connector

(Example)



In the above example, CN5 is connected with CN4 on 7 6 REAR board.

#### 4. Signal flow on the diagram

The following arrow marks indicate the specified signal paths respectively.

- ➡ : RECORDING or EE SIGNAL PATH
- ⇨ : PLAY BACK SIGNAL PATH
- ⇨ : REC/PLAY SIGNAL PATH

#### 5. Measurement of voltage and waveform

**Voltage** : Measured by digital voltmeter in REC mode. Where voltages differ between recording and playback, the voltage during playback is shown in parentheses.

**Waveform** : Waveforms (VIDEO System) are measured with a color bar during recording and playback. Waveforms (AUDIO System) are measured with 1 kHz (-8 dBs) during recording and playback.

#### 6. Unit of value

Unless otherwise specified:

- a. Resistance is in  $\Omega$  (1/6 W)
- b. Capacitance in  $\mu\text{F}$ .
- c. Inductance in  $\mu\text{H}$ .
- d. Diodes are 1SS133.
- e. Screened parts (in XXXX) are important for safety assurance. When replacing them, use specified parts.

## 4.1 KEY TO ABBREVIATIONS

<b>A</b>	<b>ACC</b>	: Automatic Color Control
	<b>ADD</b>	: Adder
	<b>ADC</b>	: Analog to Digital Converter
	<b>ADJ</b>	: Adjustment
	<b>A DUB</b>	: Audio Dubbing
	<b>AE</b>	: Audio Erase
	<b>AEF</b>	: Automatic Edition Function
	<b>AFC</b>	: Automatic Frequency Control
	<b>AFT</b>	: Automatic Fine Tuning
	<b>AGC</b>	: Automatic Gain Control
	<b>AH</b>	: Audio Head
	<b>AL</b>	: After Loading
	<b>ALC</b>	: Automatic Level Control
	<b>ALM</b>	: Alarm
	<b>AM</b>	: Amplitude Modulation
	<b>AMP</b>	: Amplifier
	<b>ANT</b>	: Antenna
	<b>APC</b>	: Automatic Phase Control
	<b>APL</b>	: Average Picture Level
	<b>ASSEM</b>	: Assembly
	<b>ASS'Y</b>	: Assembly
	<b>ATT</b>	: Attenuator
	<b>AUTO</b>	: Automatic
	<b>AUX</b>	: Auxiliary
	<b>AUD</b>	: Audio

<b>B</b>	<b>B</b>	: Brake
	<b>BAL</b>	: Balance
	<b>BATT</b>	: Battery
	<b>BCD</b>	: Binary Coded Decimal
	<b>BEG</b>	: Beginning
	<b>BFP</b>	: Burst Flag Pulse
	<b>BIT</b>	: Binary Digit
	<b>BLK</b>	: Black
	<b>BLU</b>	: Blue
	<b>BNC</b>	: Bayonet connector
	<b>BPF</b>	: Bandpass Filter
	<b>BRN</b>	: Brown
	<b>BRT</b>	: Brightness
	<b>B. SOL</b>	: Brake Solenoid
	<b>B/W</b>	: Black and White

<b>C</b>	<b>C</b>	: Ceramic
	<b>CAP</b>	: Capstan
	<b>CASS</b>	: Cassette
	<b>CF</b>	: Ceramic Filter, color Frame
	<b>CC</b>	: Cassette compartment
	<b>CE</b>	: Chip Enable
	<b>CH</b>	: Channel
	<b>CHROMA</b>	: Chrominance
	<b>CLK</b>	: Clock
	<b>CLR</b>	: Clear
	<b>CMD</b>	: Command
	<b>CNT</b>	: Count, Counter
	<b>CONV</b>	: Converter
	<b>COL</b>	: Color
	<b>COM</b>	: Common
	<b>COMP</b>	: Comparator Composite Compensation
	<b>CONN</b>	: Connector
	<b>CT</b>	: Ceramic Trap
	<b>CTC</b>	: Crosstalk Cancel
	<b>CTL</b>	: Control

<b>D</b>	<b>D</b>	: Drum
	<b>DAC</b>	: Digital to Analog Converter
	<b>DD</b>	: Direct Drive
	<b>DEC</b>	: Decoder
	<b>DEMOD</b>	: Demodulator
	<b>DET</b>	: Detector
	<b>DEV</b>	: Deviation
	<b>DFRS</b>	: Drum Free RUN STOP
	<b>DIF TRANS</b>	: Differential Transformer
	<b>DISCR</b>	: Discriminator
	<b>DL</b>	: Delay Line
	<b>DOC</b>	: Dropout Compensator
	<b>DRUM FF</b>	: Drum Flip Flop
	<b>DUB</b>	: Dubbing

<b>E</b>	<b>E</b>	: Edit, Erase
	<b>EDP</b>	: Electronic Data Processing
	<b>E-E</b>	: Electric to Electric
	<b>EF</b>	: Emitter-Follower
	<b>EMPHA</b>	: Emphasis
	<b>EMG</b>	: Emergency
	<b>ENC</b>	: Encoder
	<b>EN</b>	: Enable
	<b>EQ</b>	: Equalizer
	<b>ESNS</b>	: End Sensor
	<b>EXP</b>	: Expander
	<b>EXT</b>	: External

<b>F</b>	<b>FE</b>	: Full Erase
	<b>FF</b>	: Fast Forward Flipflop
	<b>FG</b>	: Frequency Generator
	<b>FM</b>	: Frequency Modulation
	<b>FMA</b>	: FM Audio
	<b>FREQ</b>	: Frequency
	<b>F-V CONV</b>	: Frequency to Voltage Converter
	<b>FWD</b>	: Forward

<b>G</b>	<b>GDL</b>	: Grass Delay Line
	<b>GEN LOCK</b>	: Generator Lock
	<b>GND</b>	: Ground
	<b>GRN</b>	: Green
	<b>GRY</b>	: Gray

<b>H</b>	<b>H</b>	: High, Horizontal
	<b>HG</b>	: Hall Generator
	<b>HPF</b>	: Highpass Filter

<b>I</b>	<b>IF</b>	: Intermediate Frequency
	<b>IFT</b>	: Intermediate Frequency Transformer
	<b>IND</b>	: Indicator
	<b>INH</b>	: Inhibit
	<b>INS</b>	: Insert
	<b>INT</b>	: Internal, Interrupt
	<b>INV</b>	: Inverter
	<b>I/O</b>	: Input/Output

<b>L</b>	<b>L</b>	: Low
	<b>LB</b>	: Low Band
	<b>LCD</b>	: Liquid Crystal Display
	<b>LE</b>	: Loading End
	<b>LED</b>	: Light Emitting Diode
	<b>LIN</b>	: Linearity
	<b>LIM</b>	: Limiter
	<b>LOAD</b>	: Loading
	<b>LP</b>	: Long Play

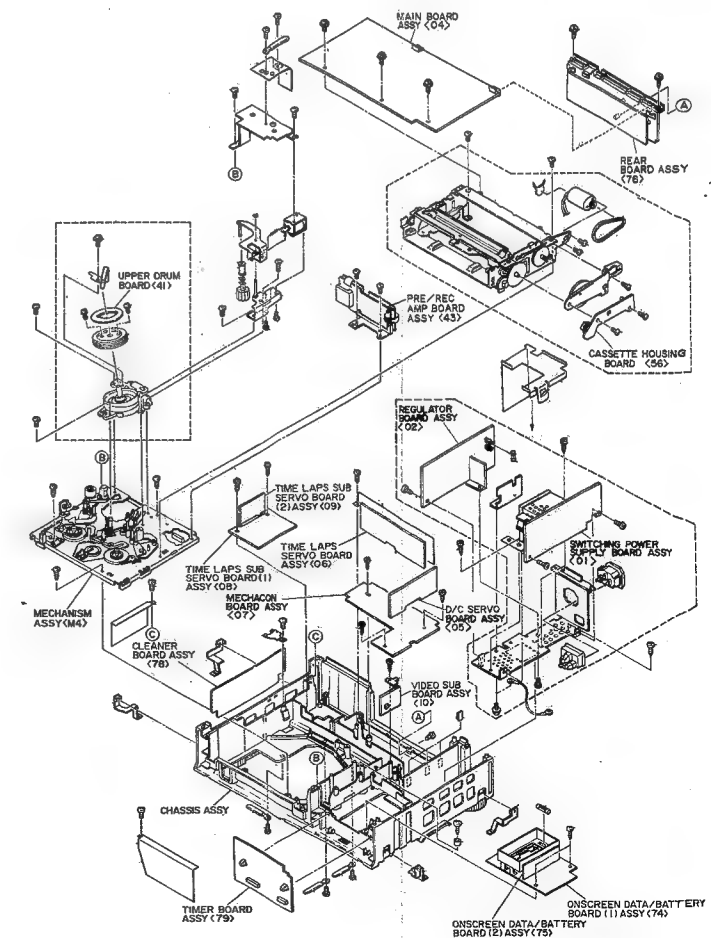
	LPF	: Lowpass Filter
	LT	: Loading Tension
M	MAX	: Maximum
	MDA	: Motor Drive Amplifier
	MIC	: Microphone
	MIN	: Minimum
	MIX	: Mixer
	MM	: Monostable Multivibrator
	MOD	: Modulator
	MON	: Monitor
	MOS	: Metal Oxide Semkonductor
	MPX	: Multiplexer
	MS	: Mode Select
	MUT	: Muting
N	NC	: Noise Cancel
	NFB	: Negative Feedback
	NO	: Normally Open
O	OPAMP	: Operational Amplifier
	OP	: Operation
	ORN	: Orange
	OSC	: Oscillator
P	PB	: Playback
	PC	: Photocoupler
	PCM	: Pulse Code Modulation
	PGM	: Program
	PG	: Pulse Generator
	PI	: Photo Interrupter
	PLL	: Phase Locked Loop
	POS	: Position
	PR	: Pinch Roller
	PREV	: Preview
	PRL	: Preroll
	PU	: Pickup
	PWB	: Printed Wiring Board
Q	Q	: Quality Factor
R	RA	: Resistor Array
		: Random Access
	RAM	: Random Access Memory
	REC	: Recording
	REG	: Regulated
	REV	: Reverse
	REW	: Rewind
	RF	: Radio Frequency
	RST	: Reset
	R/P	: Record/Playback
	RPT	: Repeat
	RT	: Rotary Transformer
	RY	: Relay
S	S	: Search, Servo
	SC	: Subcarrier
	SEAR	: Search
	SEL	: Select
	SENS	: Sensor
	SEP	: Separator
	SF	: Source Follower
	SFF	: Short Fast Forward
	SFWD	: Search Forward
	SI	: Serial In
	SIG	: Signal
	SO	: Serial Out

	SOL	: Solenoid
	SOS	: Sound on Sound
	SP	: Standard Play
	SR	: Supply Reel
	SREV	: Search Reverse
	SREW	: Short Rewind
	SSG	: Sync Signal Generator
	STL	: Still
	SUP	: Supply
	SYNC	: Synchronization
	SYSCON	: System control
T	TBC	: Time Base Corrector
	TC	: Tension Control, Time Code
	TDG	: Time Date Generator
	T. EALM	: Tape End Alarm
	TEN	: Tension
	TIM	: Timing
	TK	: Tracking
	TL	: Time Lapse
	TREC	: Timer Record
	TSW	: Time Switch
	TU	: Take-up
	TUR	: Take-up Reel
U	UNLD	: Unloading
	UNREG	: Unregulated
	UNSW	: Unswitched
V	V	: Video, Vertical
	VCO	: Voltage Controlled Oscillator
	VD	: Vertical Drive
	VXO	: Variable Crystal Oscillator
	VLT	: Violet
	VSCH	: Variable Search
W	WHT	: White
	WV	: Working Voltage
	WARN	: Warning
X	XTL	: Crystal
Y	Y	: Luminance
	YLW	: Yellow

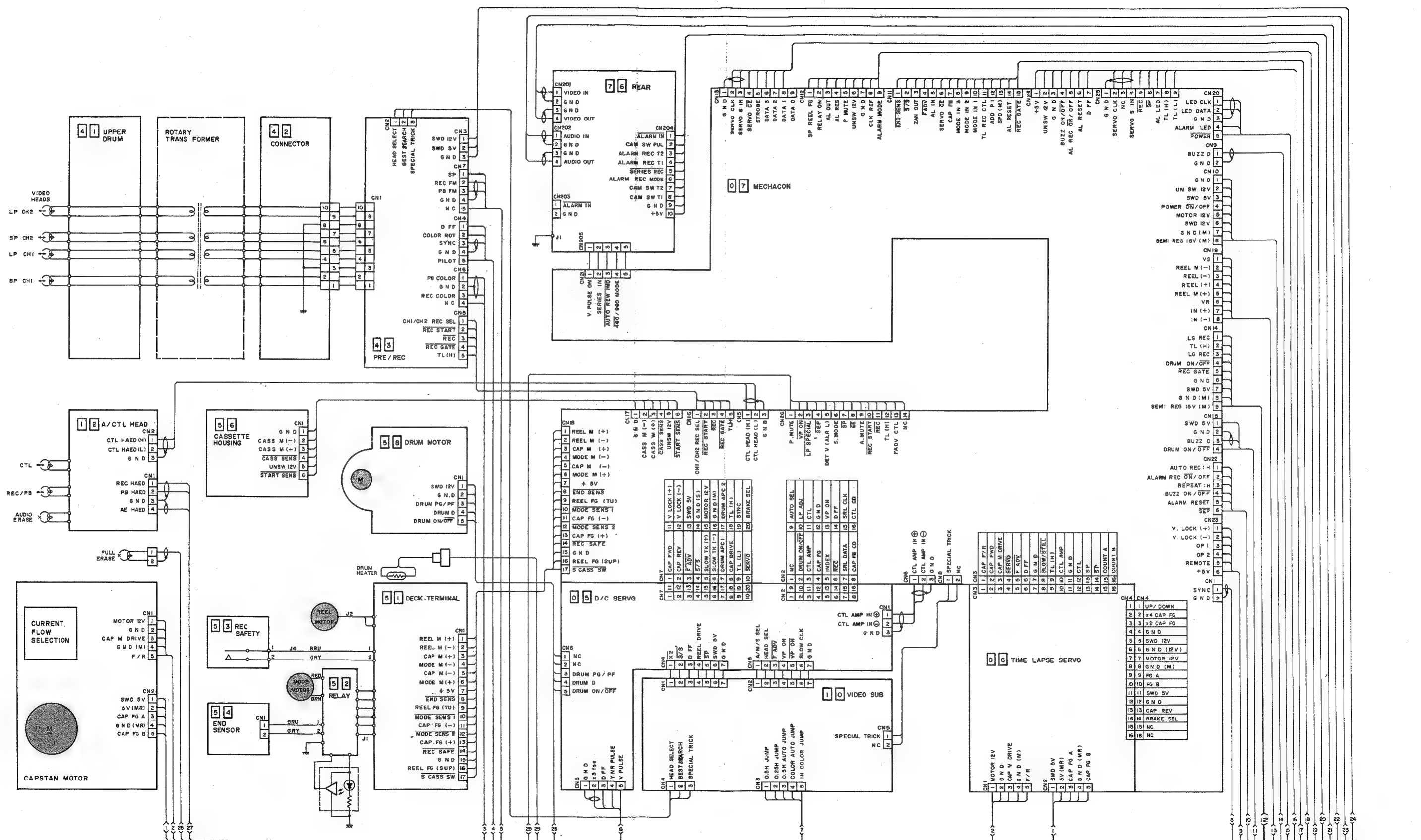
## 4.2 CIRCUIT BOARD LOCATIONS

• Index to board by kind of diagrams

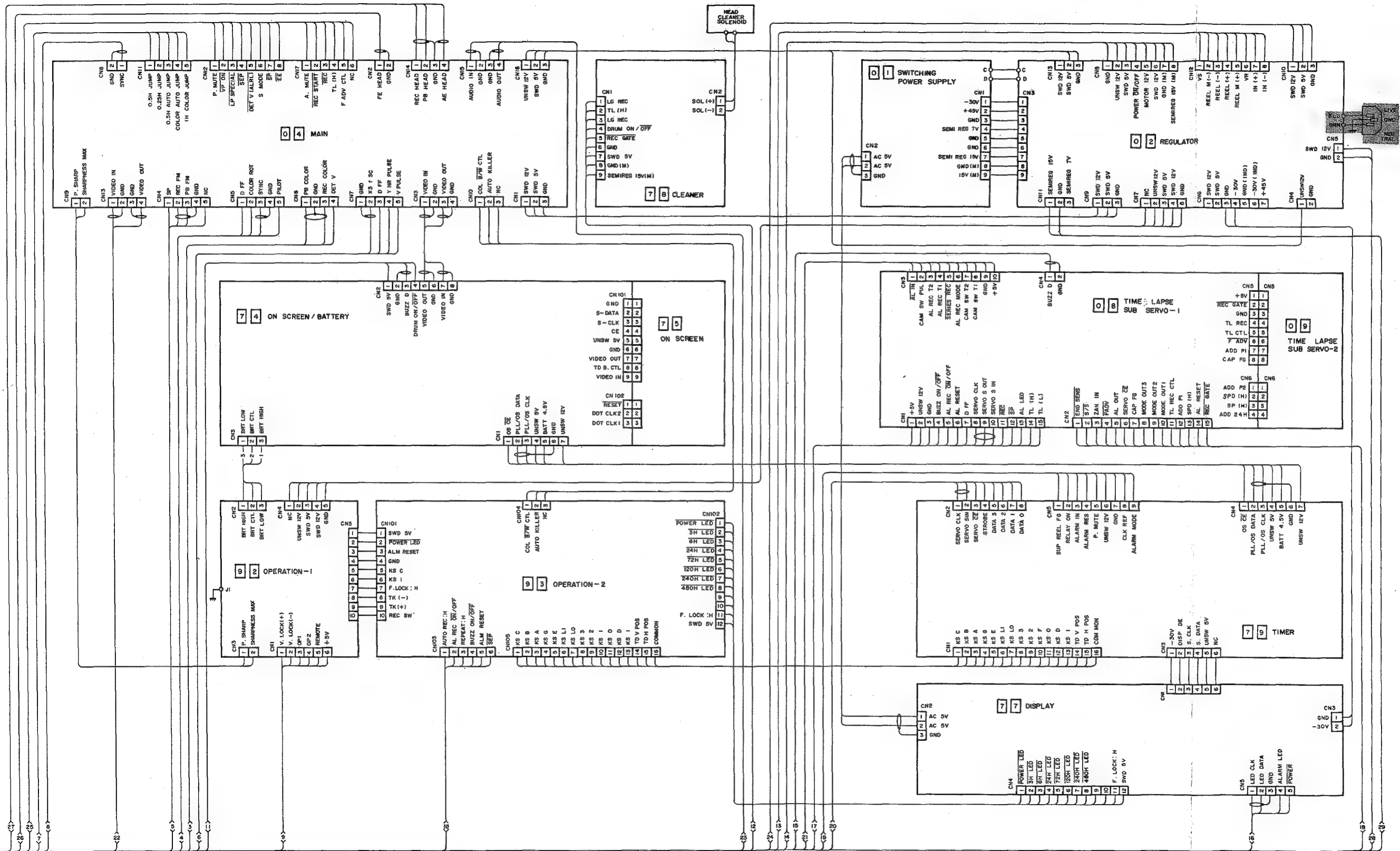
Board No.	Board Name	Page of Diagram			
		Block diagram	Schematic diagram	Circuit board	Part list
01	SWITCHING P.S	—	4-12	4-13	6-6
02	REGULATOR	—	4-12	4-13	6-6
04	MAIN	4-6	4-14	4-17	6-8
	< VIDEO Y SECTION >	4-6	4-15	4-17	6-11
	< VIDEO C SECTION >				
05	< AUDIO SECTION >	4-7	4-16	4-17	6-13
06	D/C SERVO	4-9	4-18	4-19	6-14
07	TIME LAPSE SERVO	4-8	4-23, 24	4-22	6-15
08	MECHACON	4-10	4-25, 26	4-27	6-16
	TIME LAPSE SUB SERVO (1)	—	4-20	4-21	6-18
09	TIME LAPSE SUB SERVO (2)	—	4-20	4-21	6-19
10	VIDEO SUB	4-9	4-28	4-28	6-19
12	A/C HEAD	4-7	—	4-42	6-20
41	UPPER DRUM	4-11	4-4	—	6-20
43	VIDEO PRE/REC	4-11	4-30, 31	4-31	6-20
51	DECK TERMINAL	4-10	4-43	4-42	6-22
52	RELAY	4-10	4-43	4-42	6-22
53	REC SAFETY	4-10	4-43	4-42	6-22
54	END SENSOR	4-10	4-43	4-42	6-22
56	CASSETTE HOUSING	4-10	4-43	4-42	6-22
74	ON SCREEN DATA/BATTERY (1)	—	4-32	4-33	6-22
75	ON SCREEN DATA/BATTERY (2)	—	4-32	4-33	6-23
76	REAR	—	4-29	4-29	6-23
77	DISPLAY	—	4-34	4-35	6-23
78	CLEANER	—	4-36	4-37	6-24
79	TIMER	—	4-38	4-39	6-24
92	OPERATION 1	—	4-40	4-41	6-25
93	OPERATION 2	—	4-40	4-41	6-26



# 4.3 OVERALL WIRING DIAGRAM (1/2)

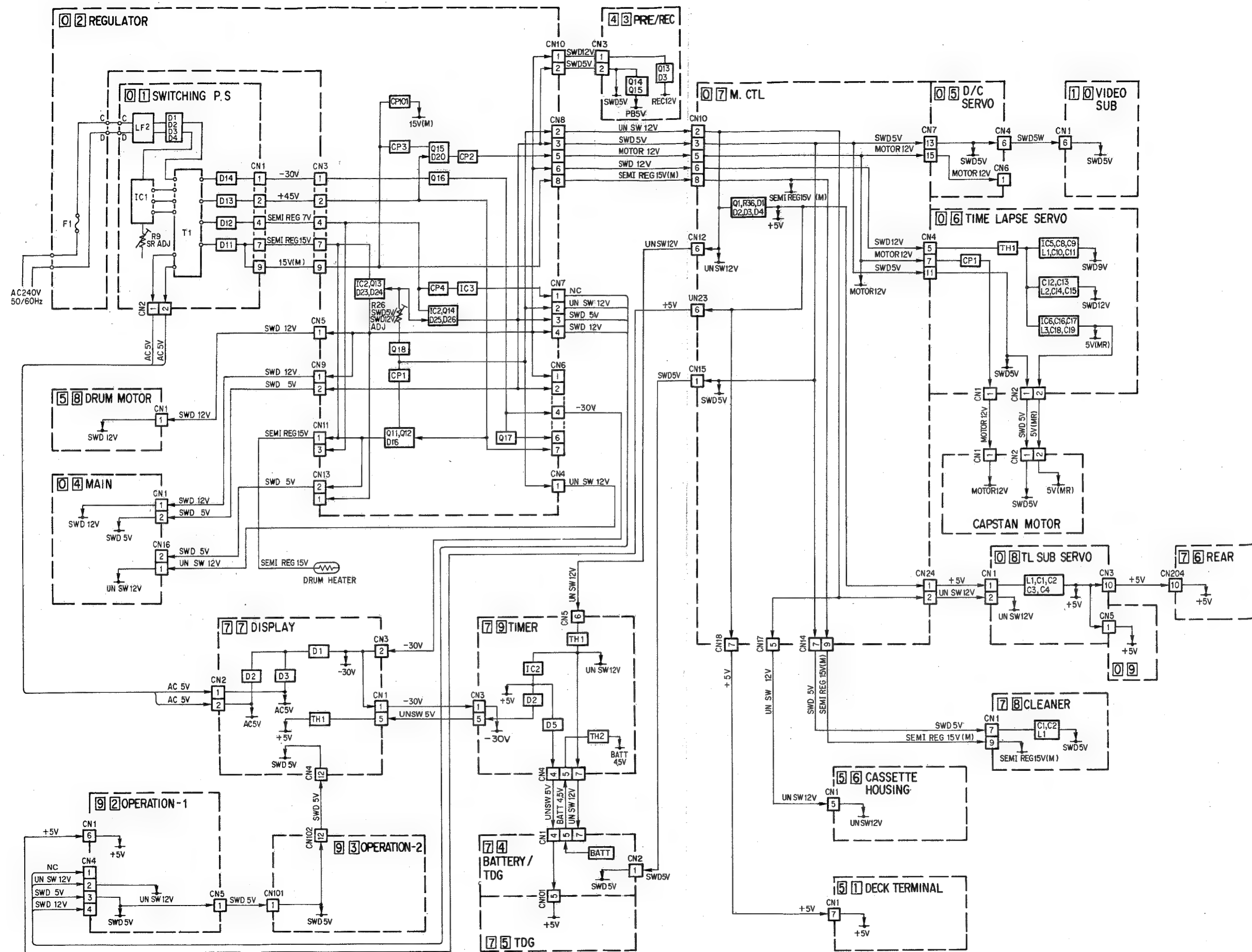


## OVERALL WIRING DIAGRAM (2/2)

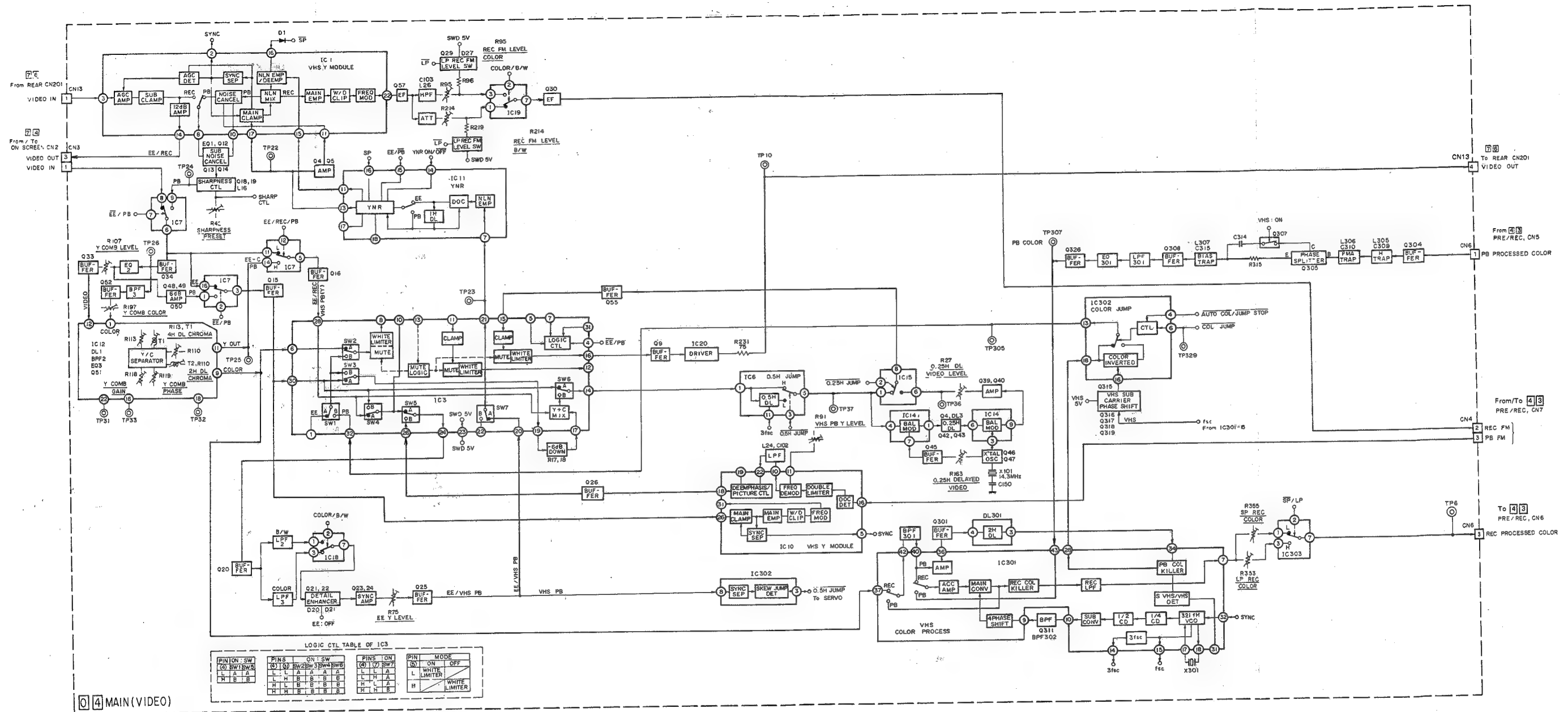




# 4.4 POWER SYSTEM BLOCK DIAGRAM



# 4.5 MAIN (VIDEO) BLOCK DIAGRAMS



## 6



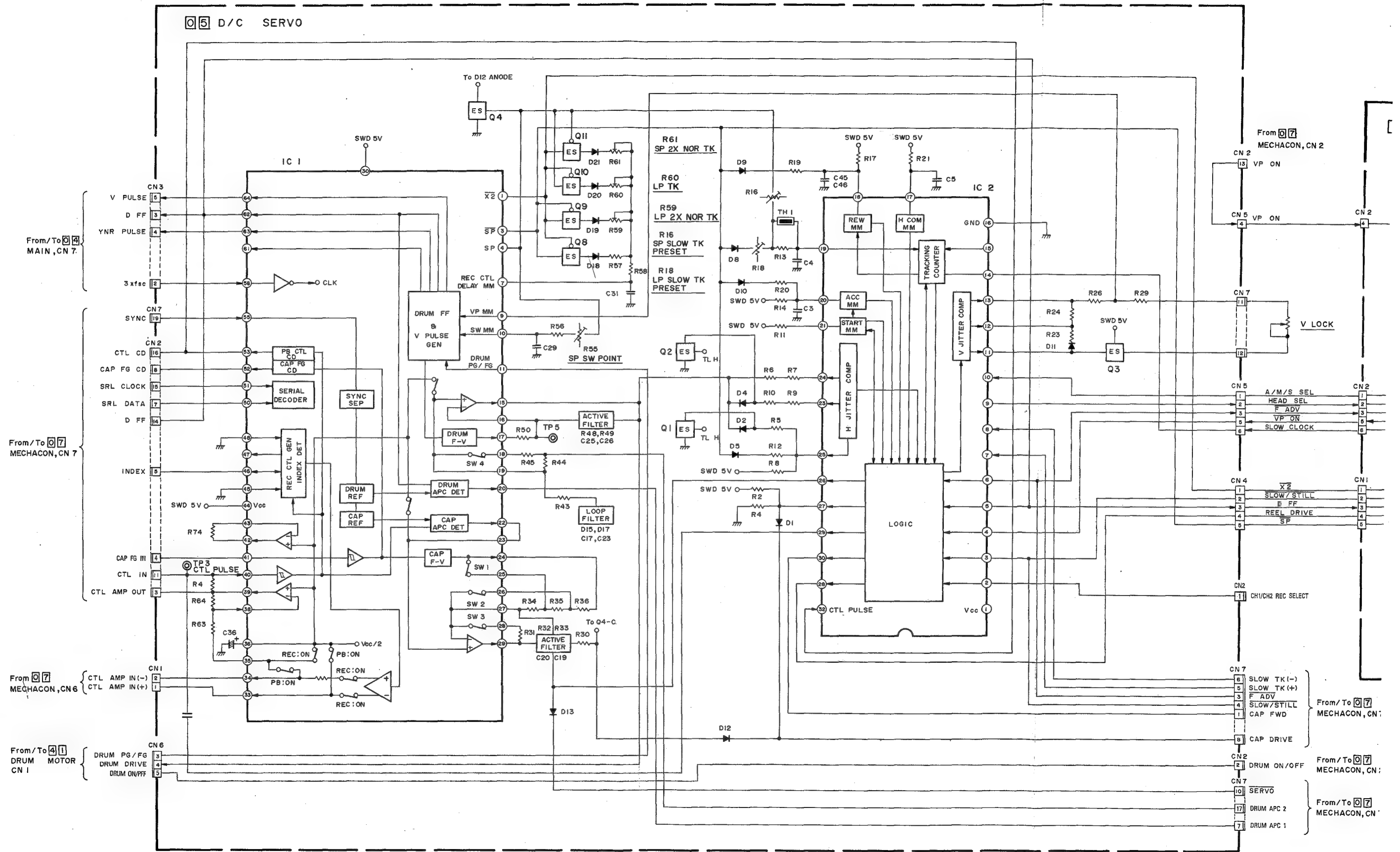
4

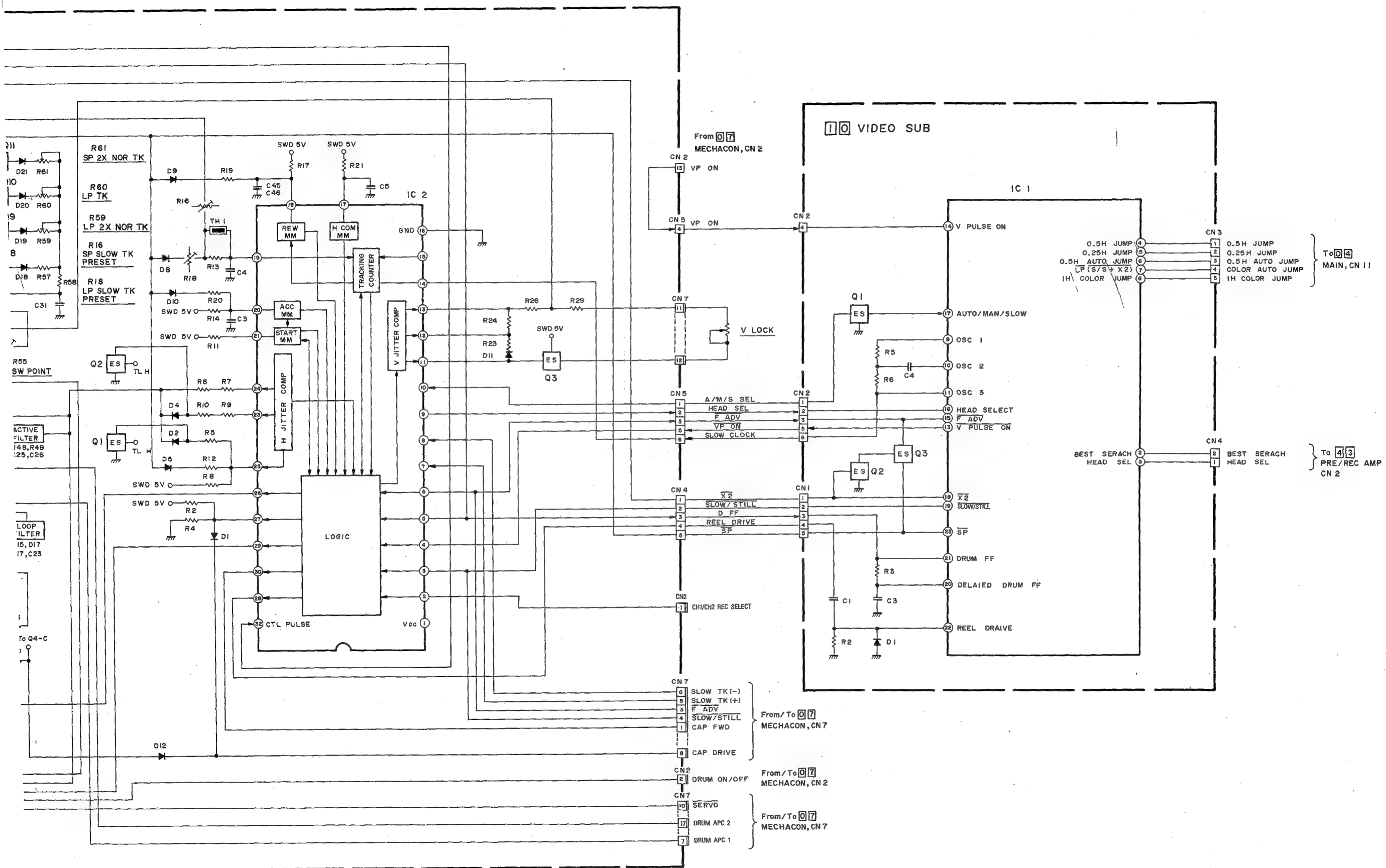
2

1

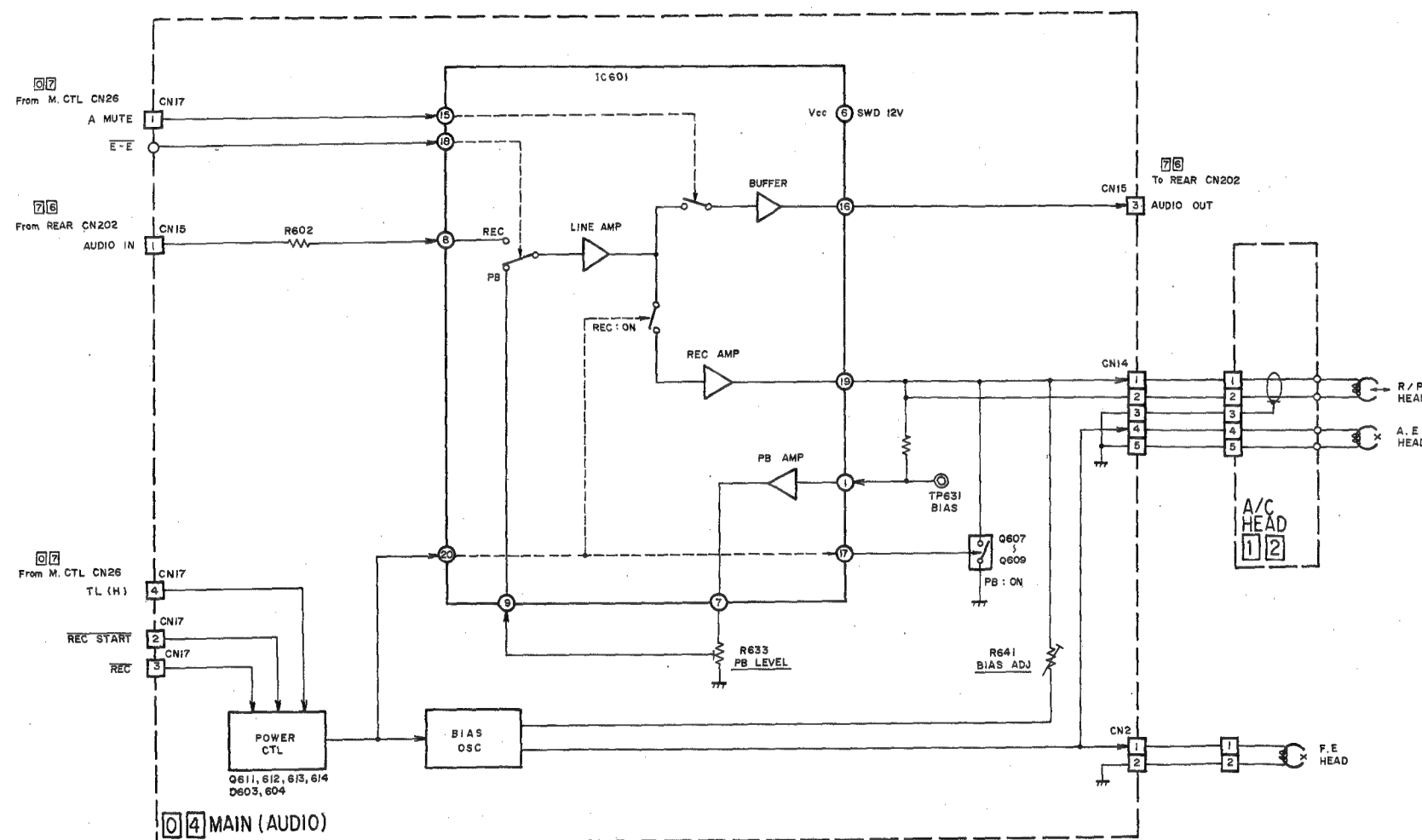
A	B	C	4-8	4-8	E	F	G	H
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# SERVO BLOCK DIAGRAM (2/2)

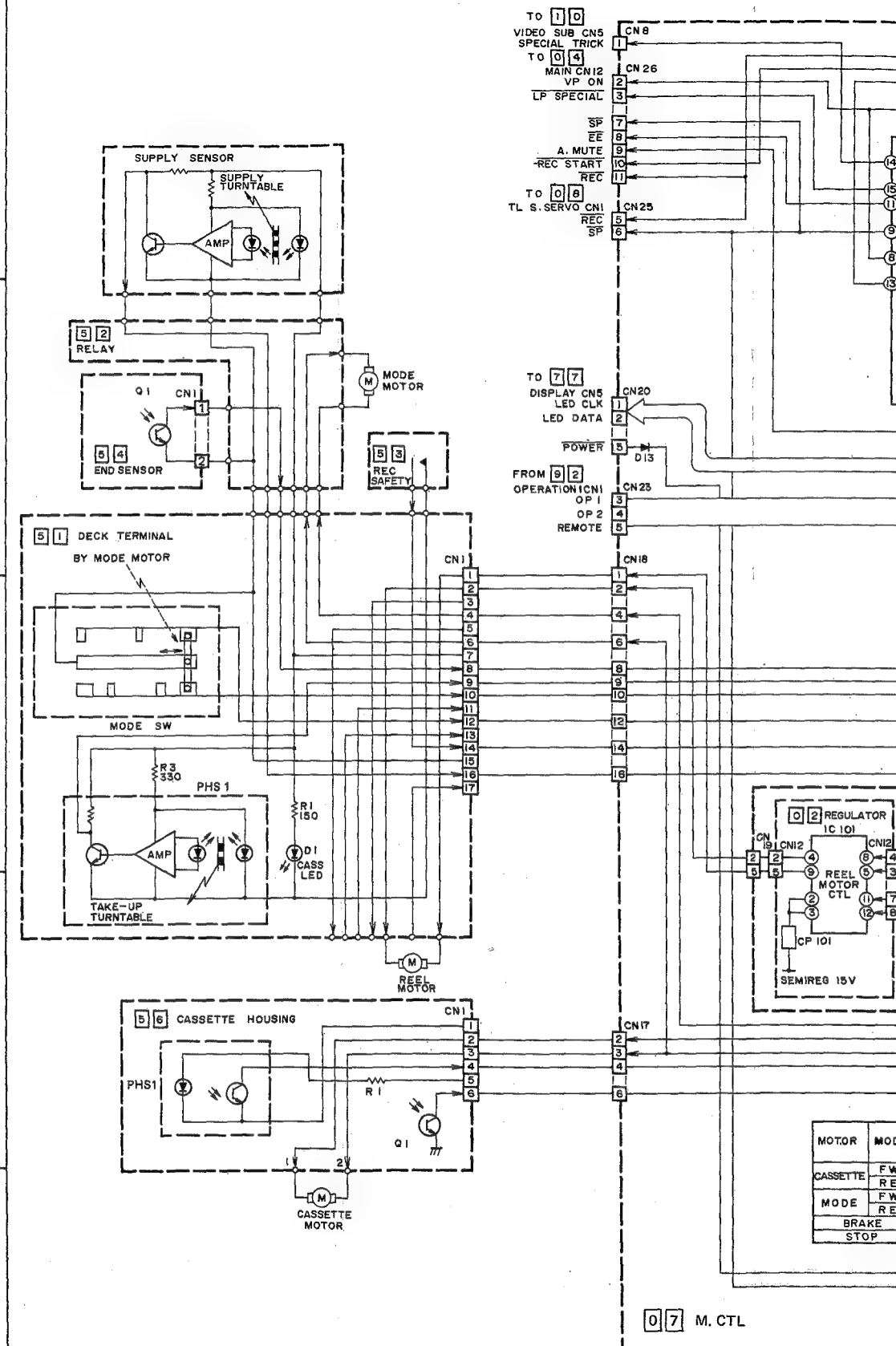




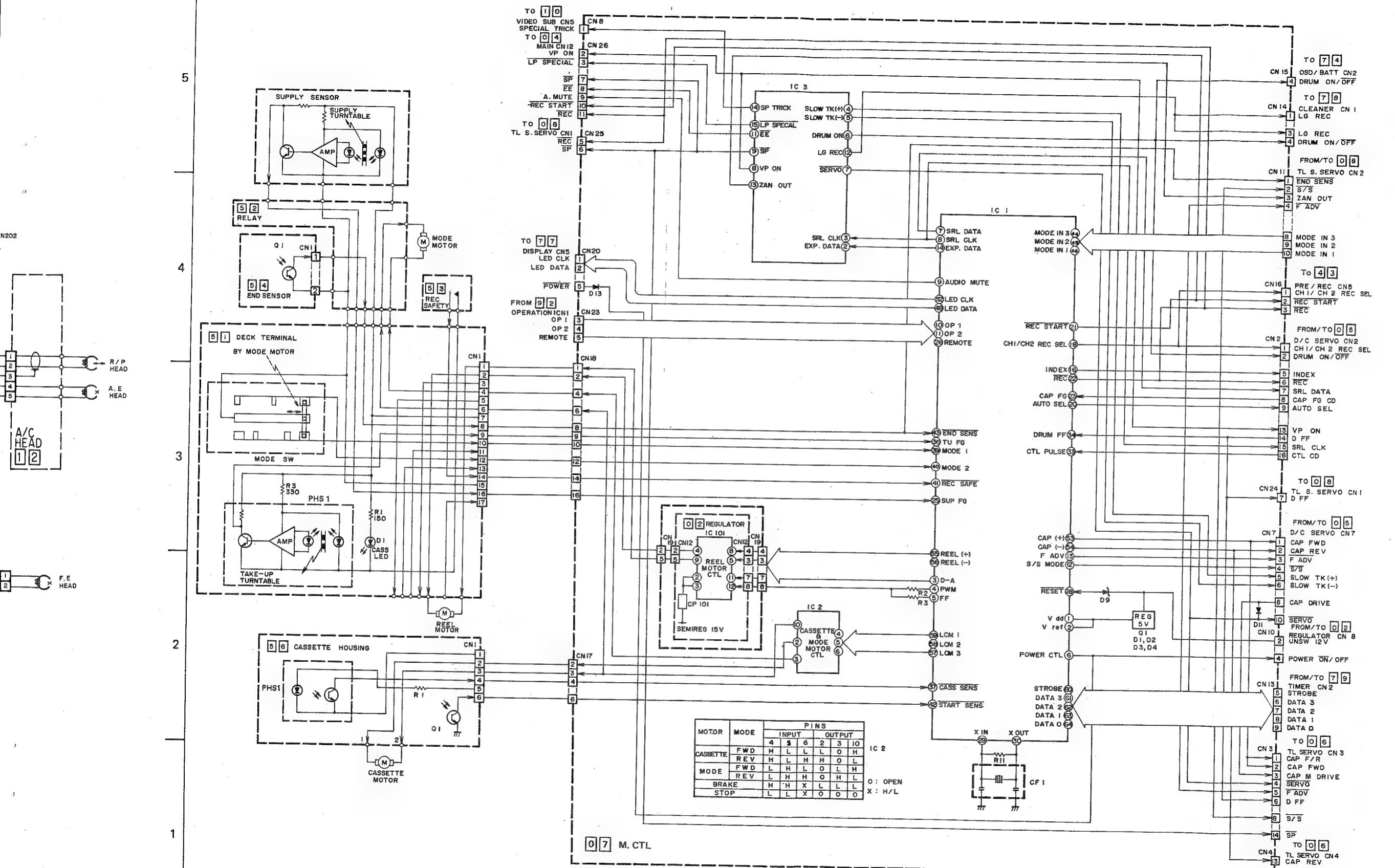
# 4.7 MAIN (AUDIO) BLOCK DIAGRAM



# 4.8 MECHACON BLOCK DIAGRAM

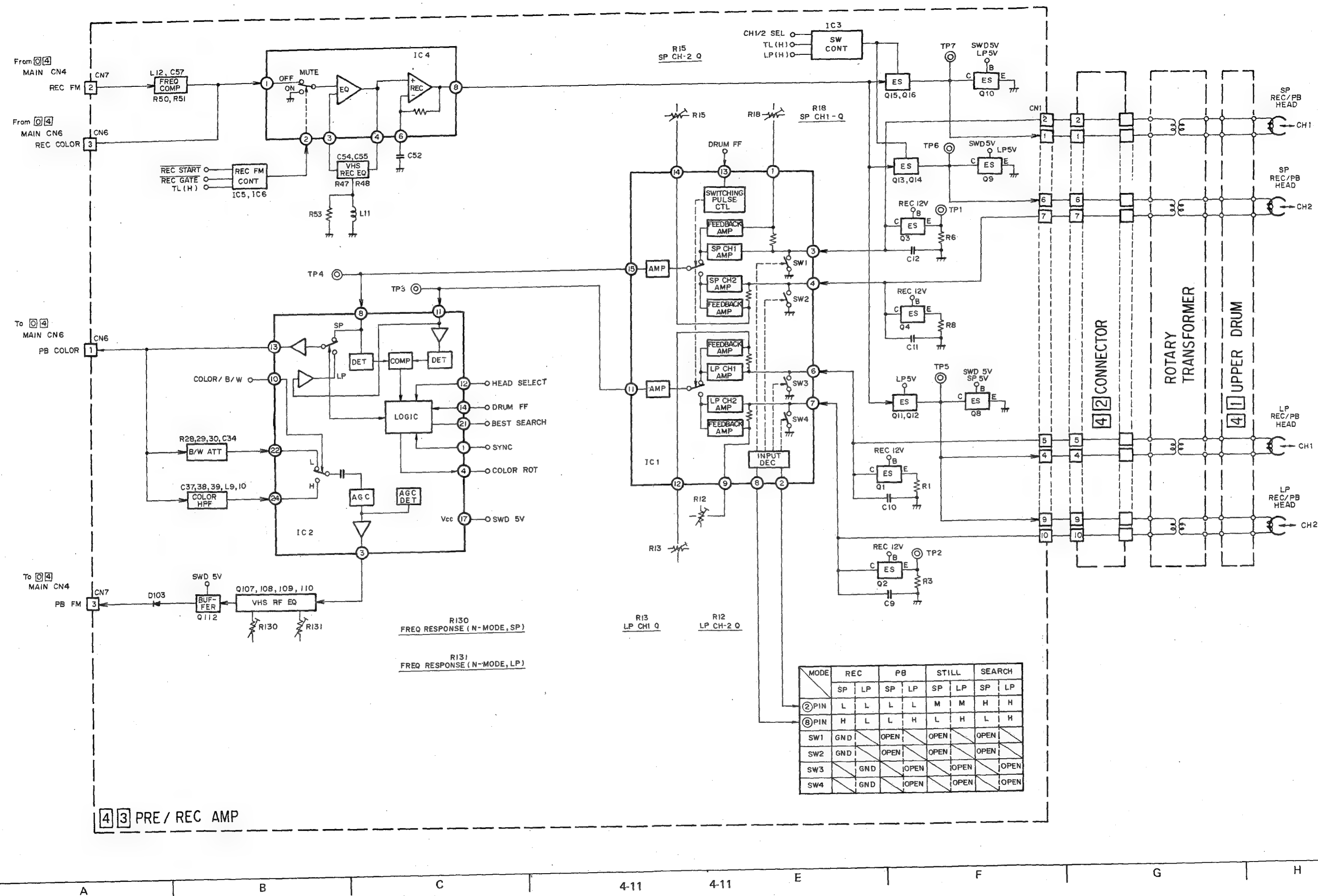


# 4.8 MECHACON BLOCK DIAGRAM





# 4.9 VIDEO PRE/REC BLOCK DIAGRAM

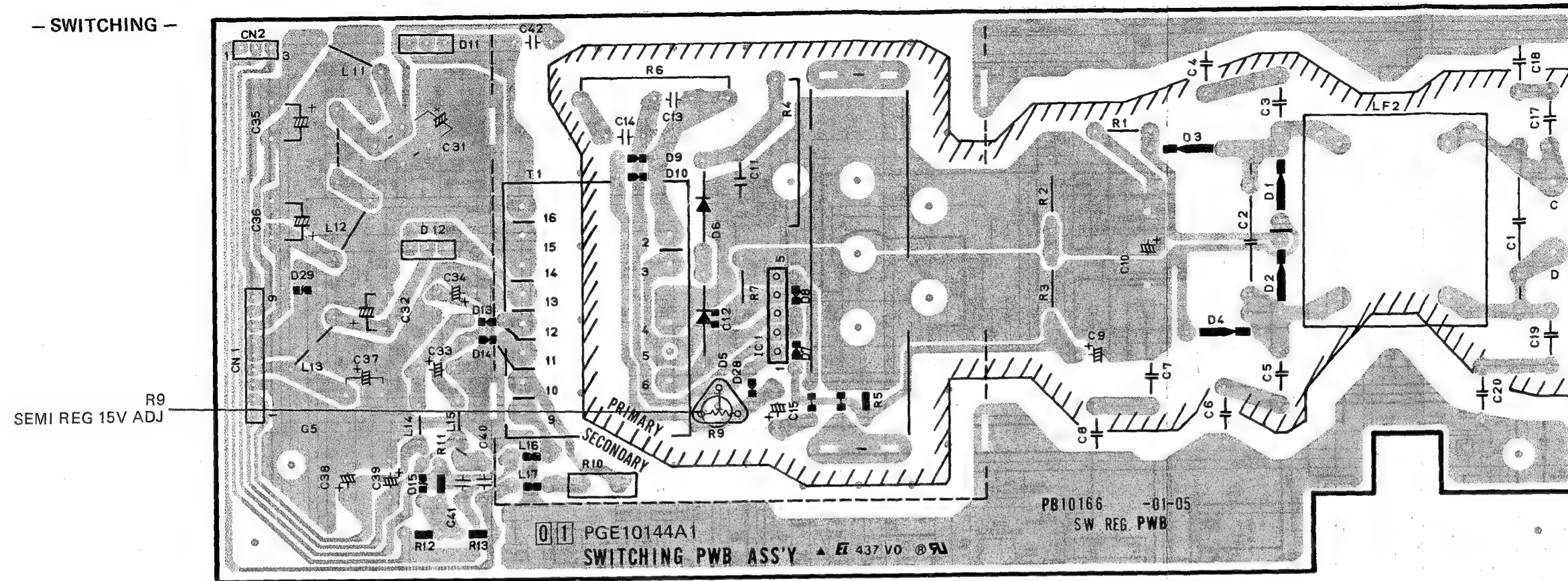


## 6

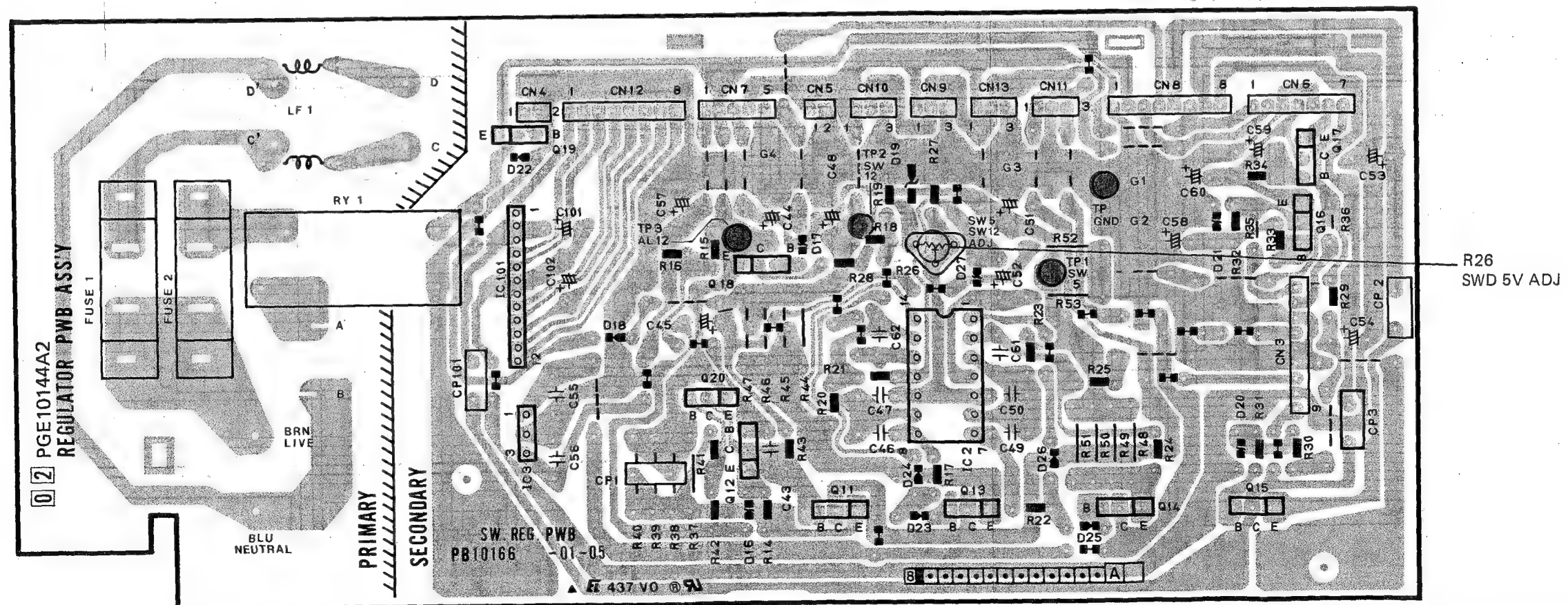


# 4.11 POWER TRANS CIRCUIT BOARD

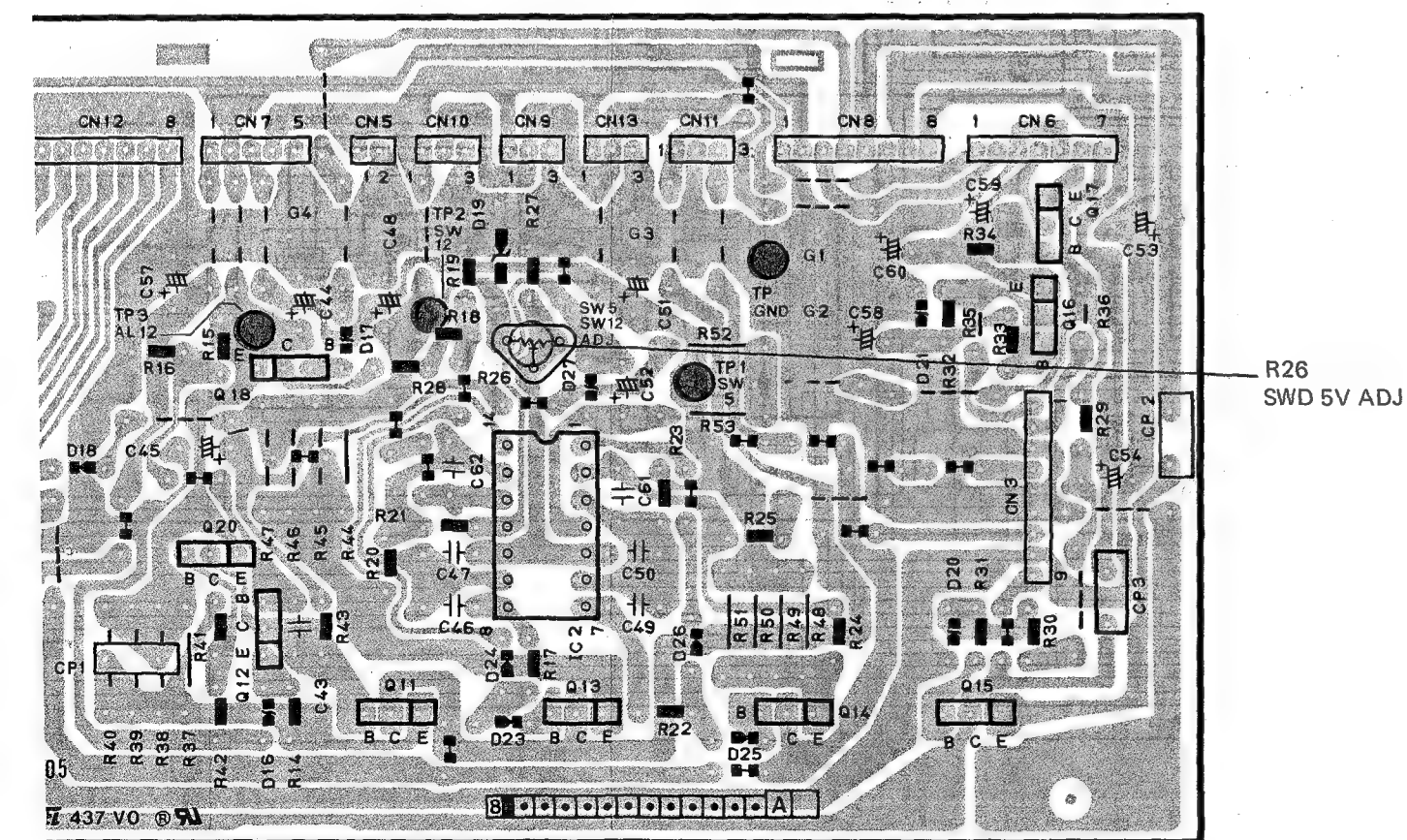
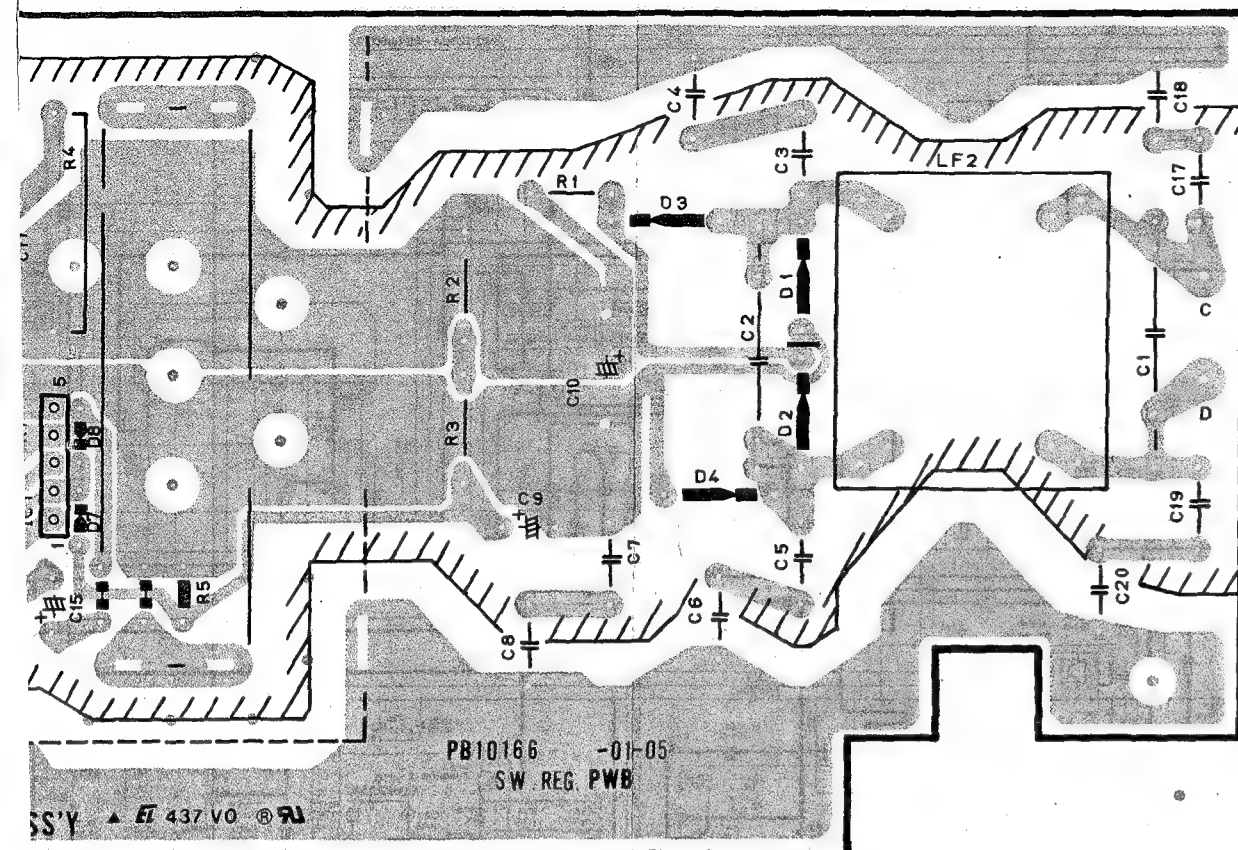
— SWITCHING —



— REGULATOR —



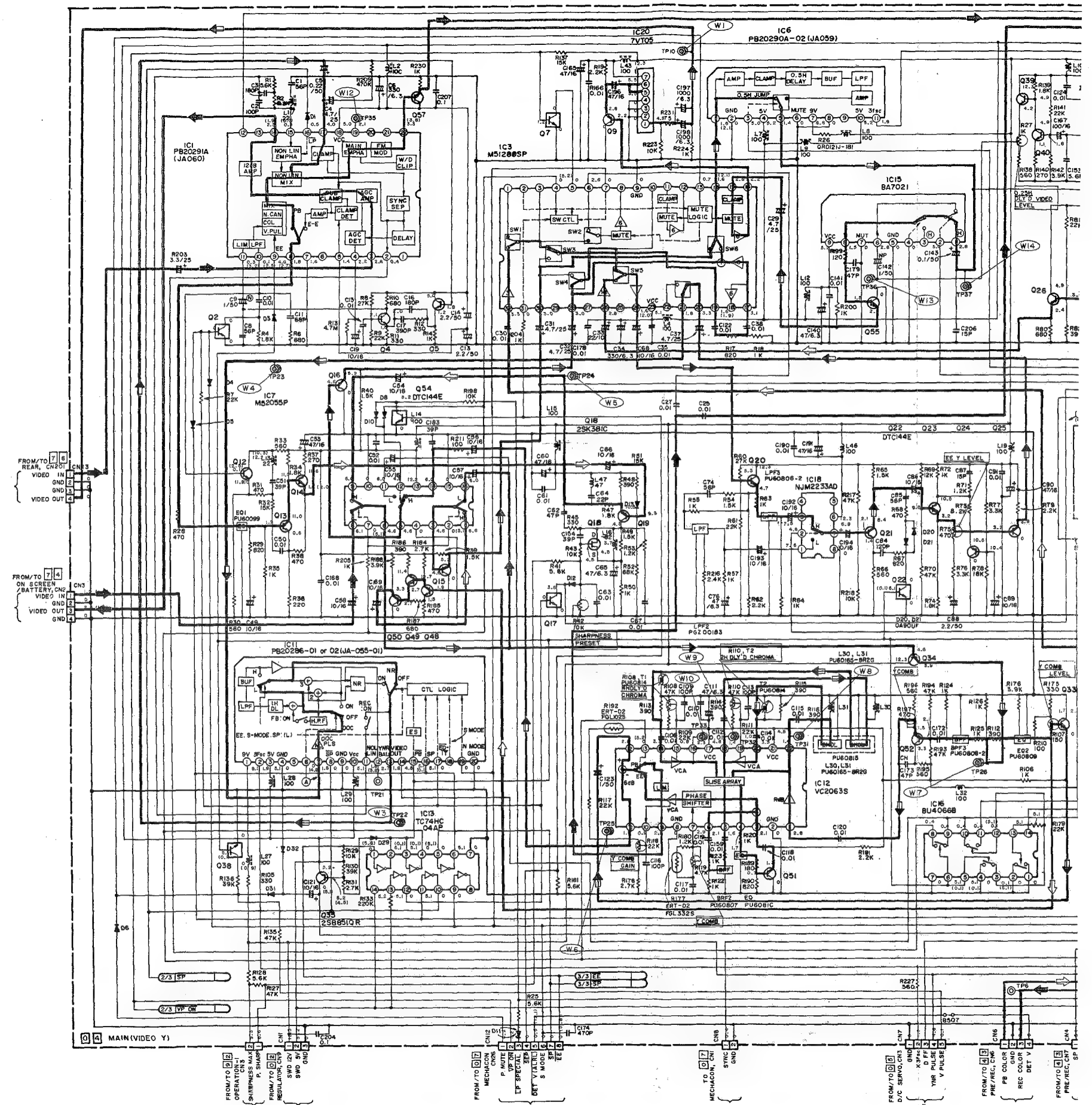
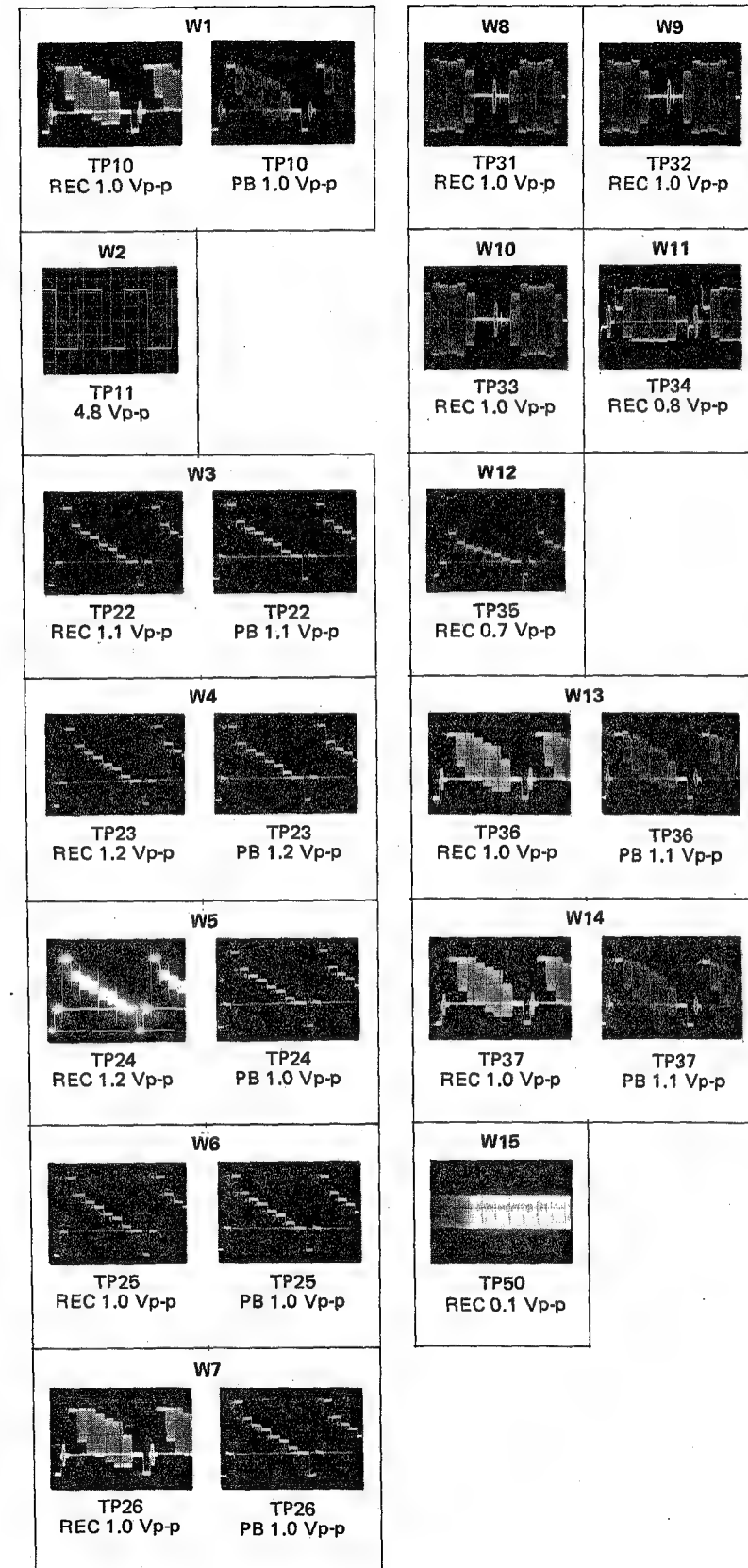




# 4.12 MAIN (VIDEO) SCHEMATIC DIAGRAM

— Y SECTION —

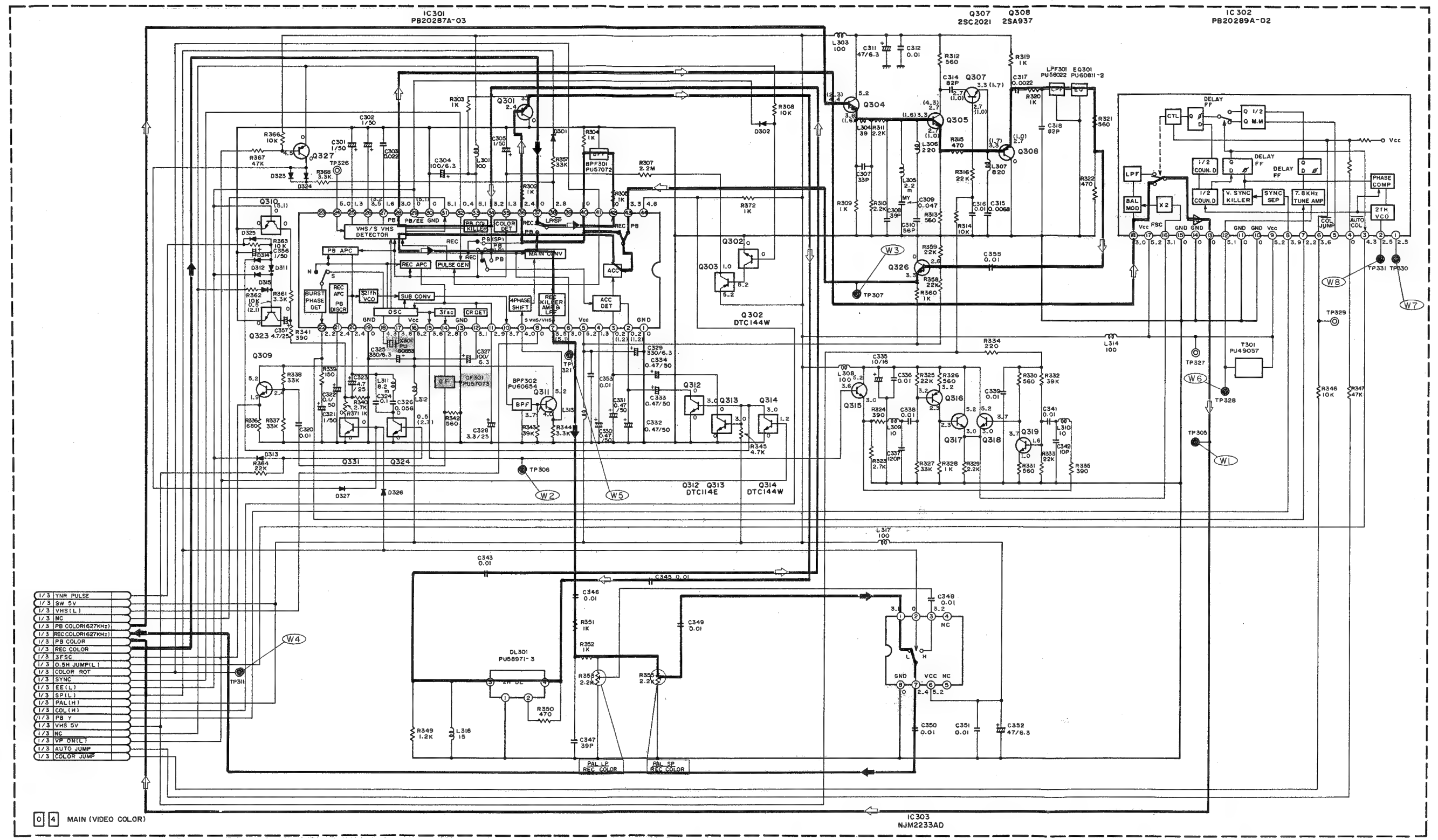
## — MAIN WAVEFORMS OF VIDEO CIRCUIT —







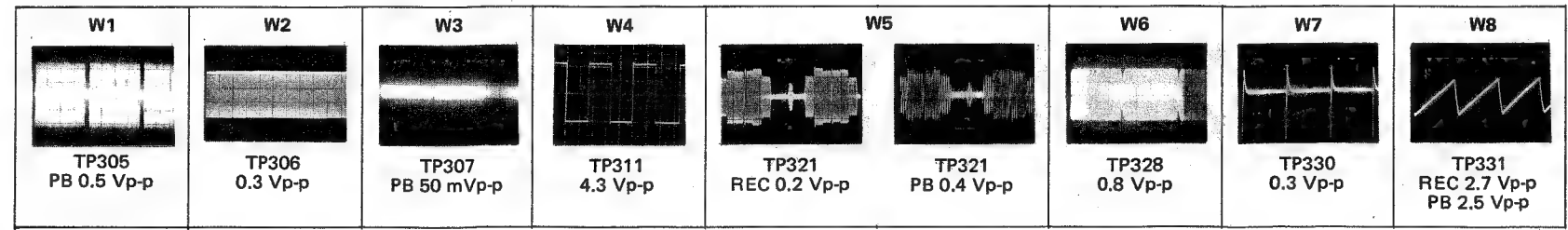
- COLOR SECTION -



- 1/3 YNR PULSE
- 1/3 SW 5V
- 1/3 VHS(L)
- 1/3 NC
- 1/3 PB COLOR(627KHZ)
- 1/3 REC COLOR(627KHZ)
- 1/3 PB COLOR
- 1/3 REC COLOR
- 1/3 3FSC
- 1/3 0.5H JUMP(L)
- 1/3 COLOR ROT
- 1/3 SYNC
- 1/3 EE(L)
- 1/3 SP(L)
- 1/3 PAL(H)
- 1/3 COL(H)
- 1/3 PB Y
- 1/3 VHS 5V
- 1/3 NC
- 1/3 VP ON(L)
- 1/3 AUTO JUMP
- 1/3 COLOR JUMP

MAIN (VIDEO COLOR)

- MAIN WAVEFORMS OF VIDEO CIRCUIT -



TP331  
REC 2.7 Vp-p  
PB 2.5 Vp-p

## 6



4



2

**B**

C

4-16

E

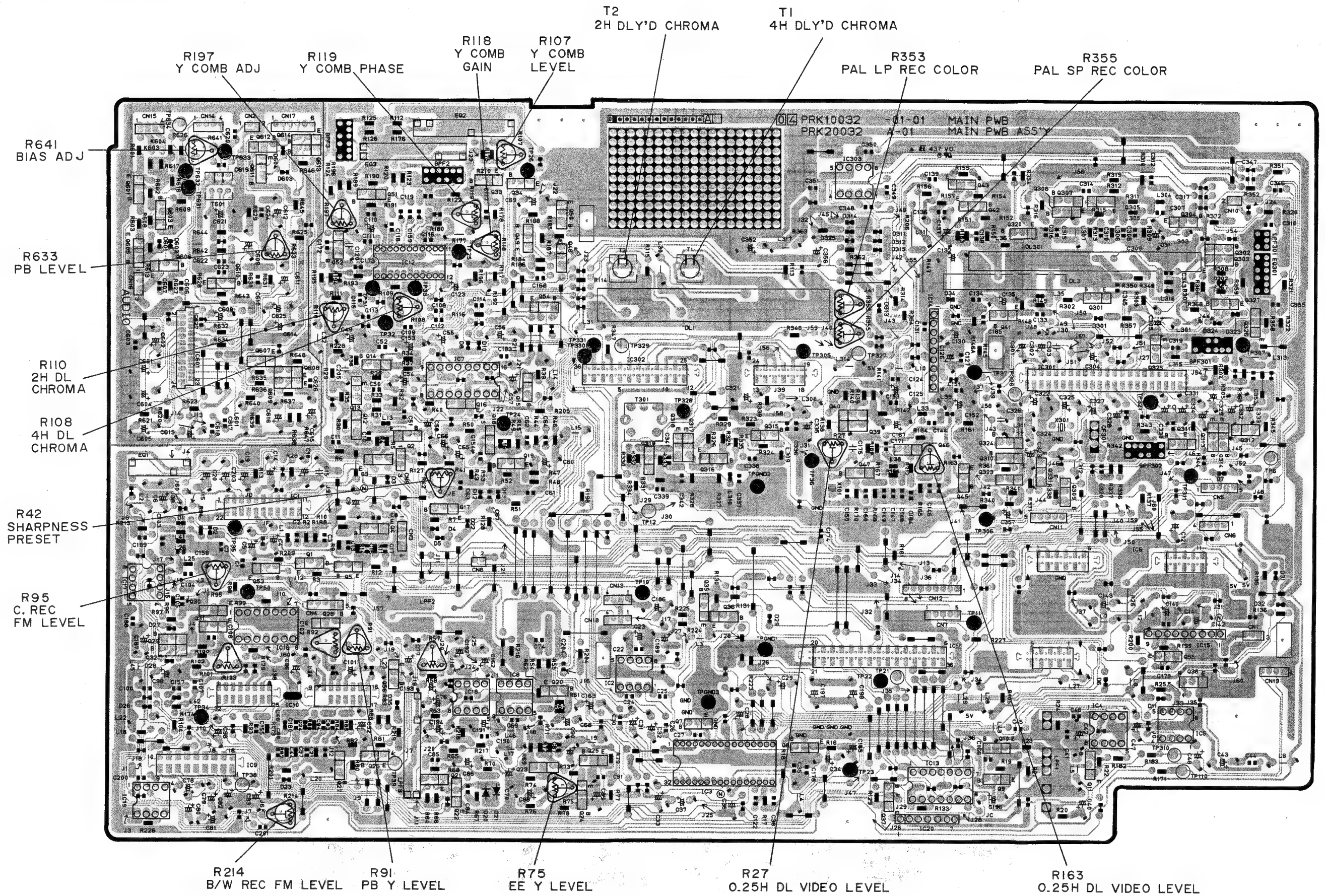
—

G

H



# 4.14 MAIN CIRCUIT BOARD



A

B

C

4-17

4-17

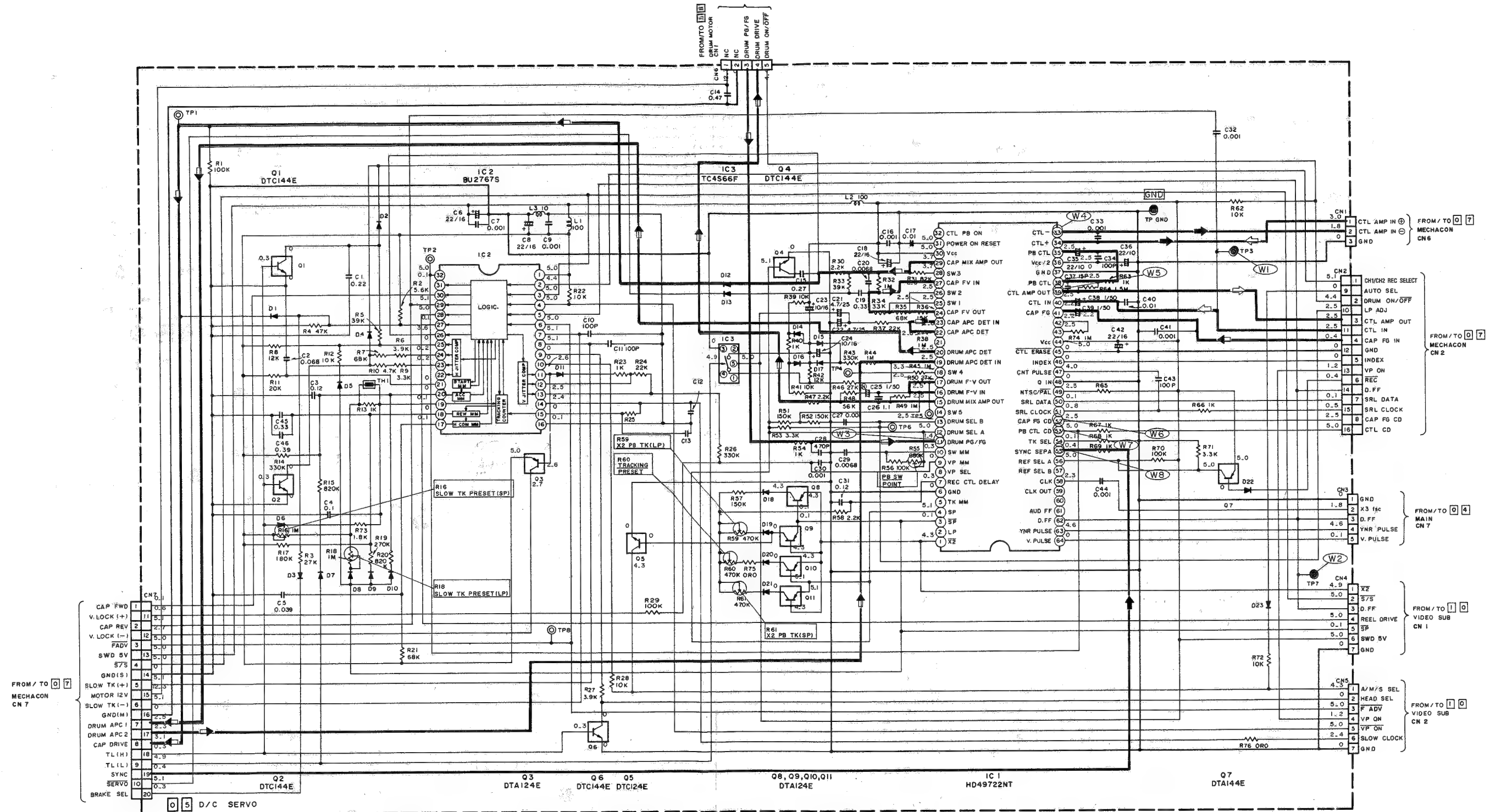
E

F

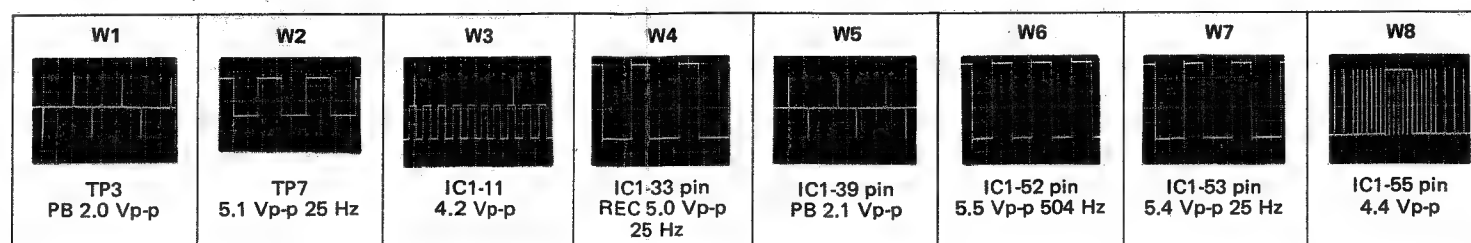
G

H

# 4.15 D/C SERVO SCHEMATIC DIAGRAM

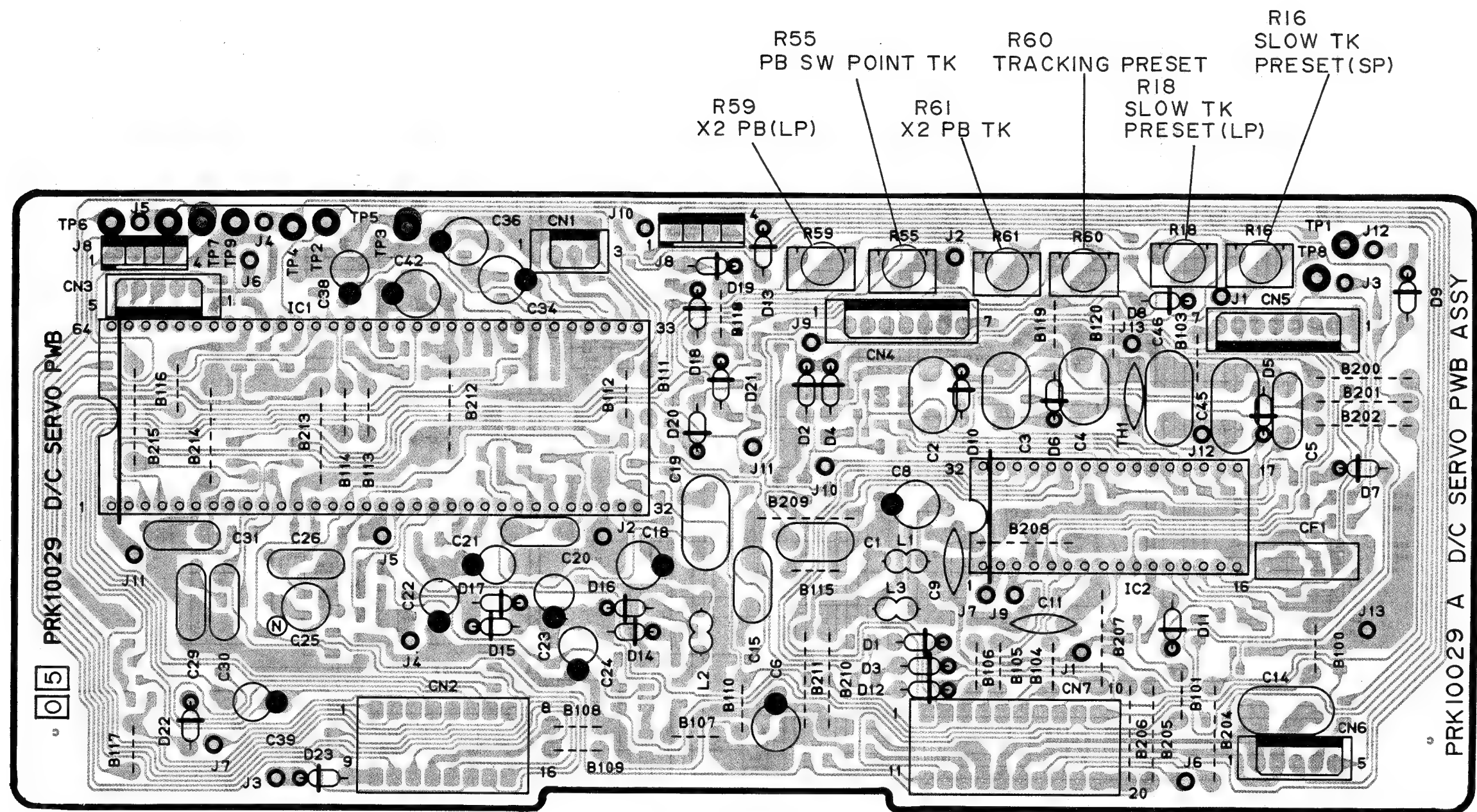


— MAIN WAVEFORMS OF SERVO CIRCUIT —





4.16 D/C SERVO CIRCUIT BOARD



R55  
PB SW POINT TK

R59  
X2 PB(LP)

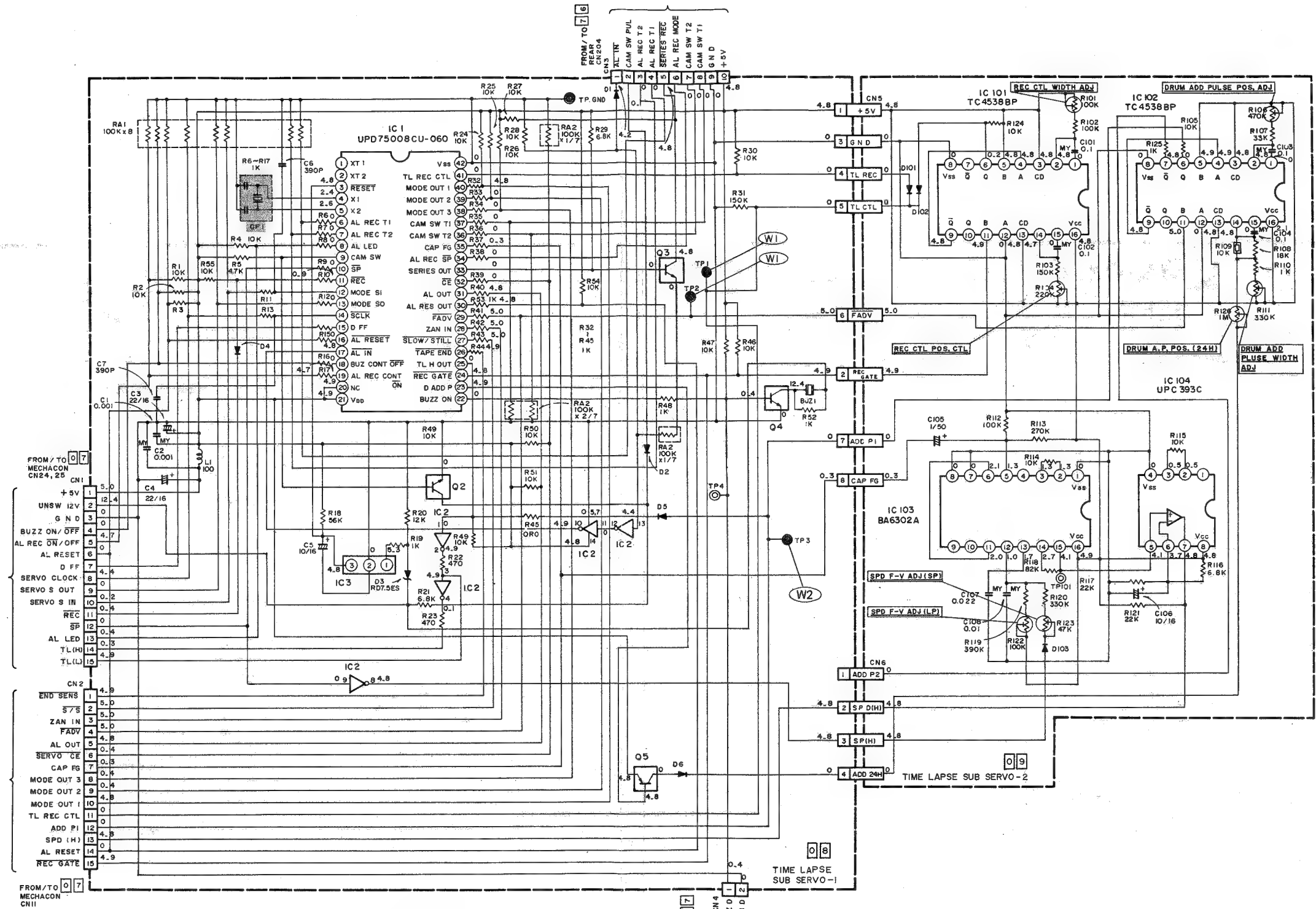
R60  
TRACKING PRESET

R61  
X2 PB TK

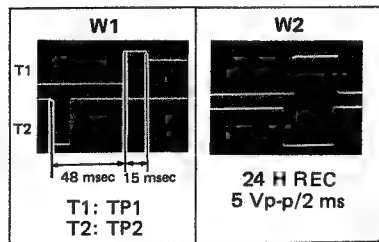
R18  
SLOW TK  
PRESET(LP)

R16  
SLOW TK  
PRESET(SP)

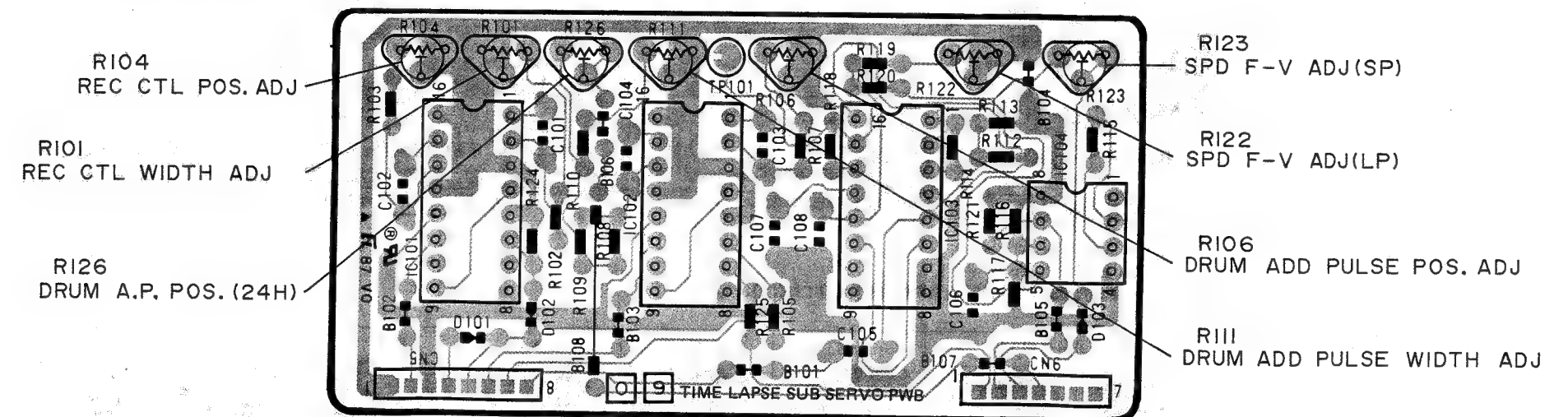
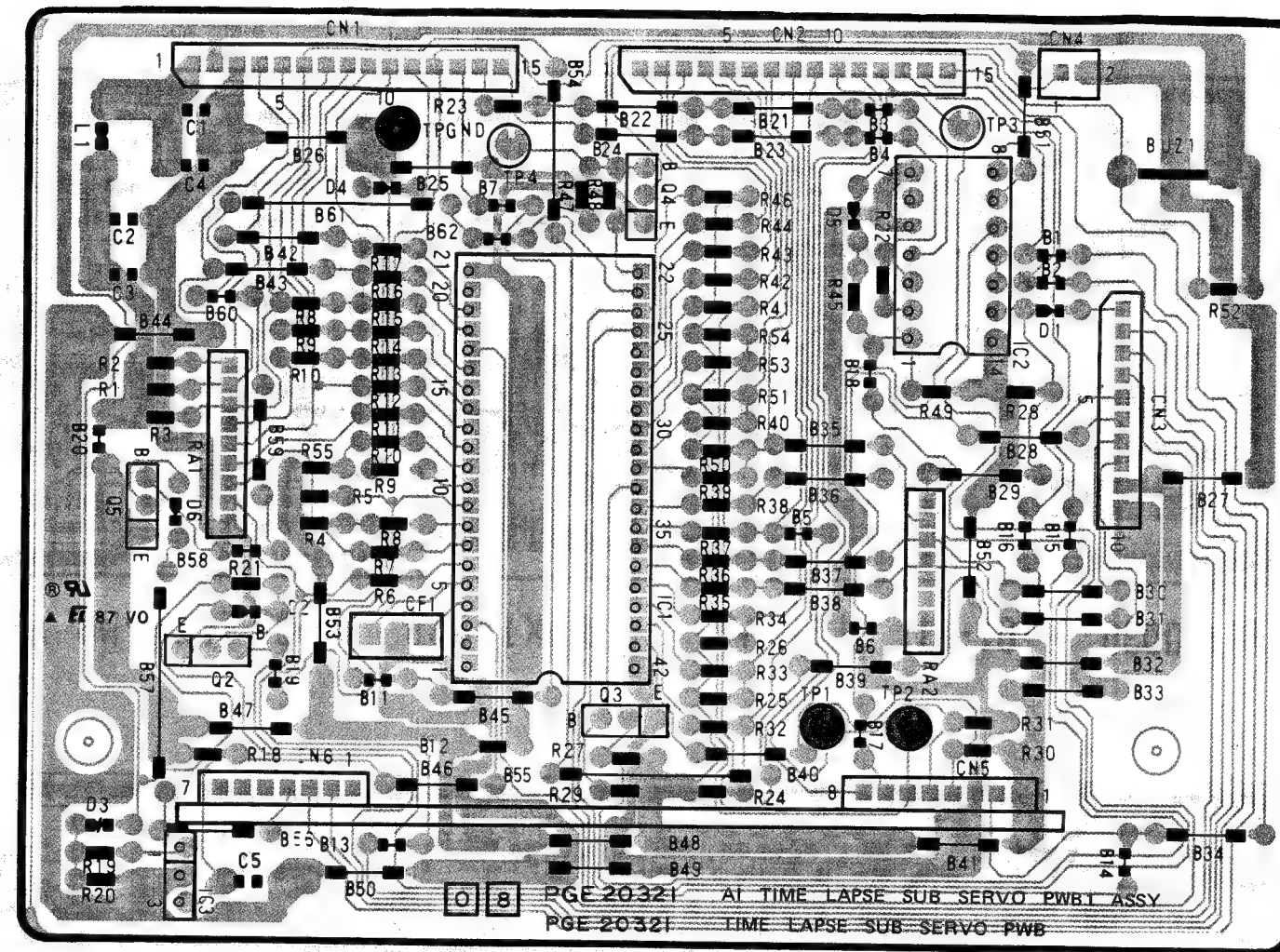
4.17 TIME LAPSE SUB SERVO SCHEMATIC DIAGRAM



— MAIN WAVEFORMS OF TIME  
LAPSE SUB SERVO CIRCUIT —



# 4.18 TIME LAPSE SUB SERVO CIRCUIT BOARD

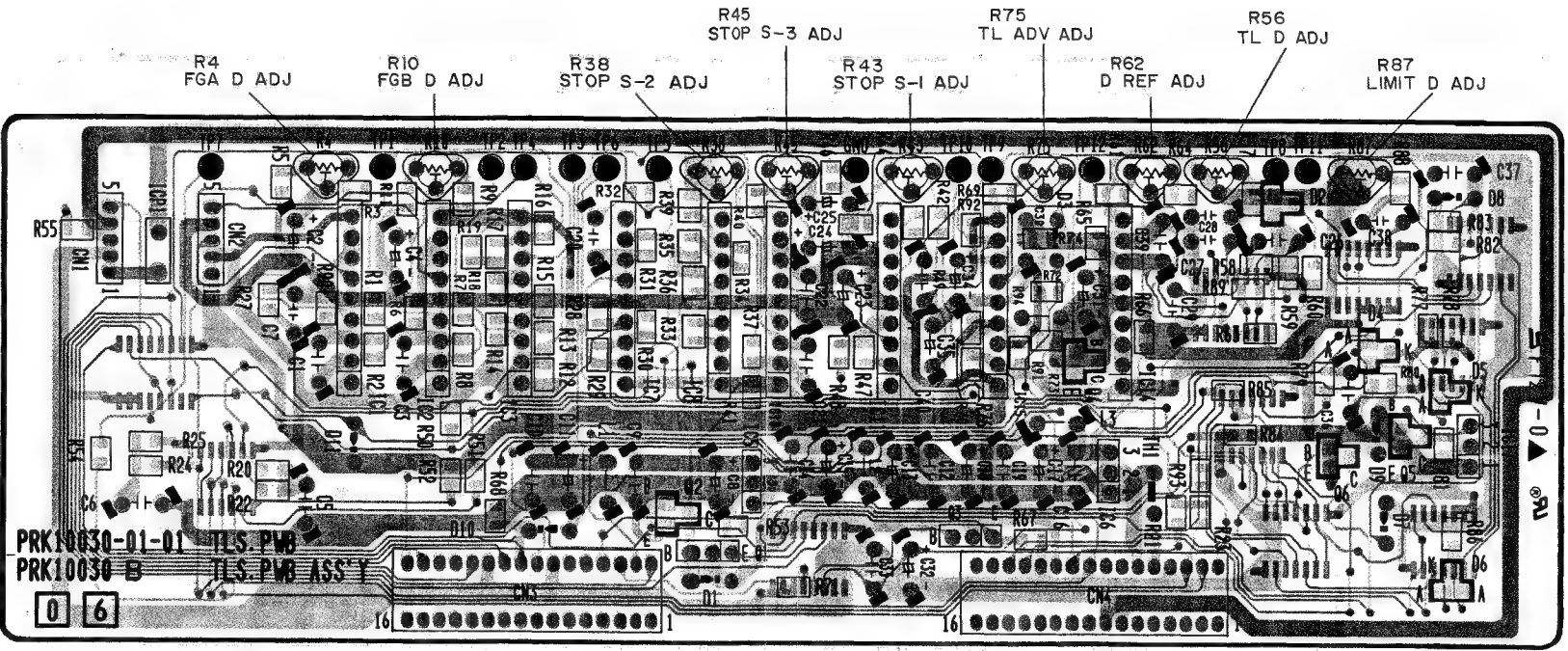


TIME LAPSE SUB SERVO PWB  
PGE20231  
TIME LAPSE SUB SERVO PWB 2 ASSY  
PGE20321A2



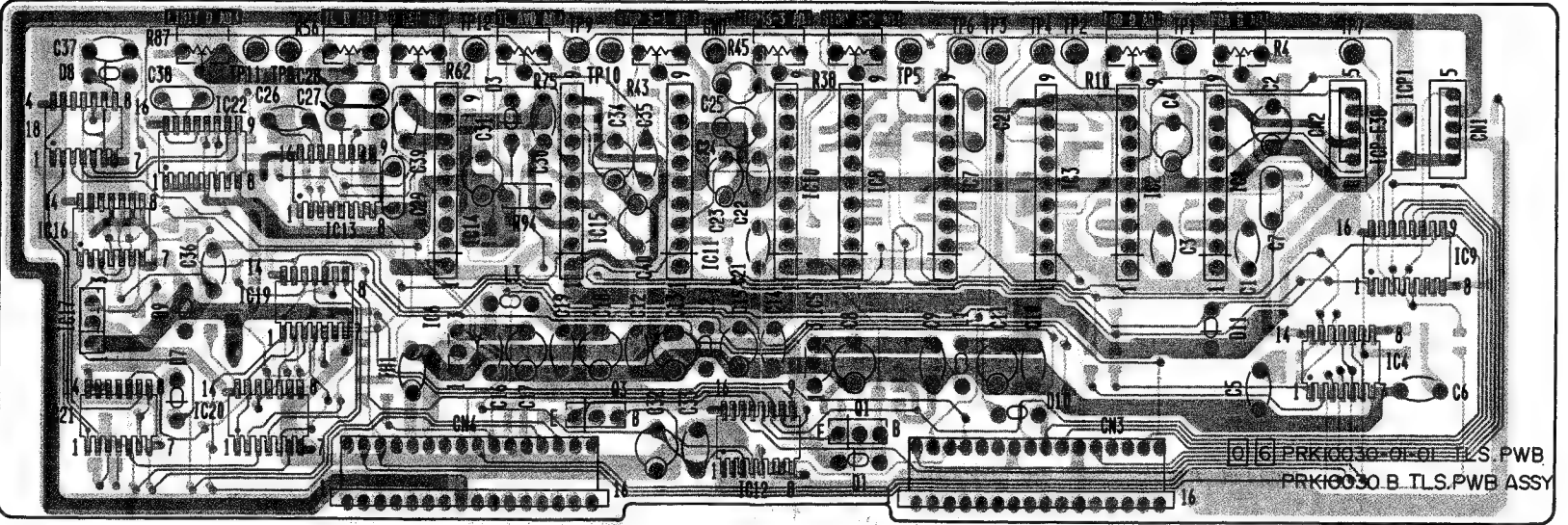
4.19 TIME LAPSE SERVO CIRCUIT BOARD

- REAR -

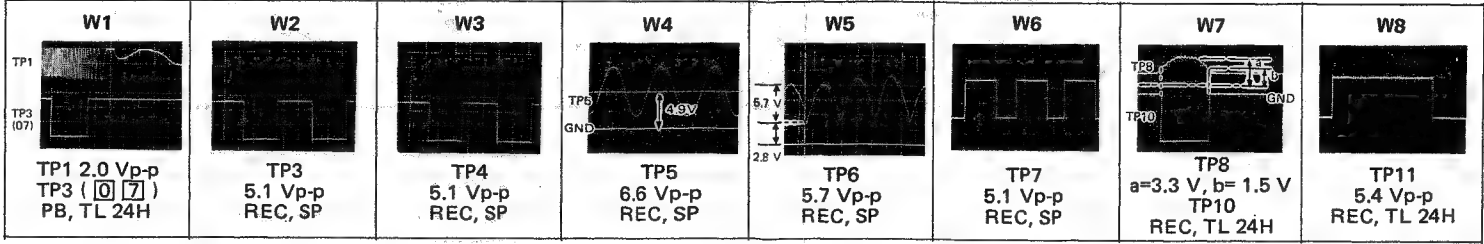


PRK10030 -01-01 TLS.PWB PRK10030 A-01 TLS.PWB ASS'Y

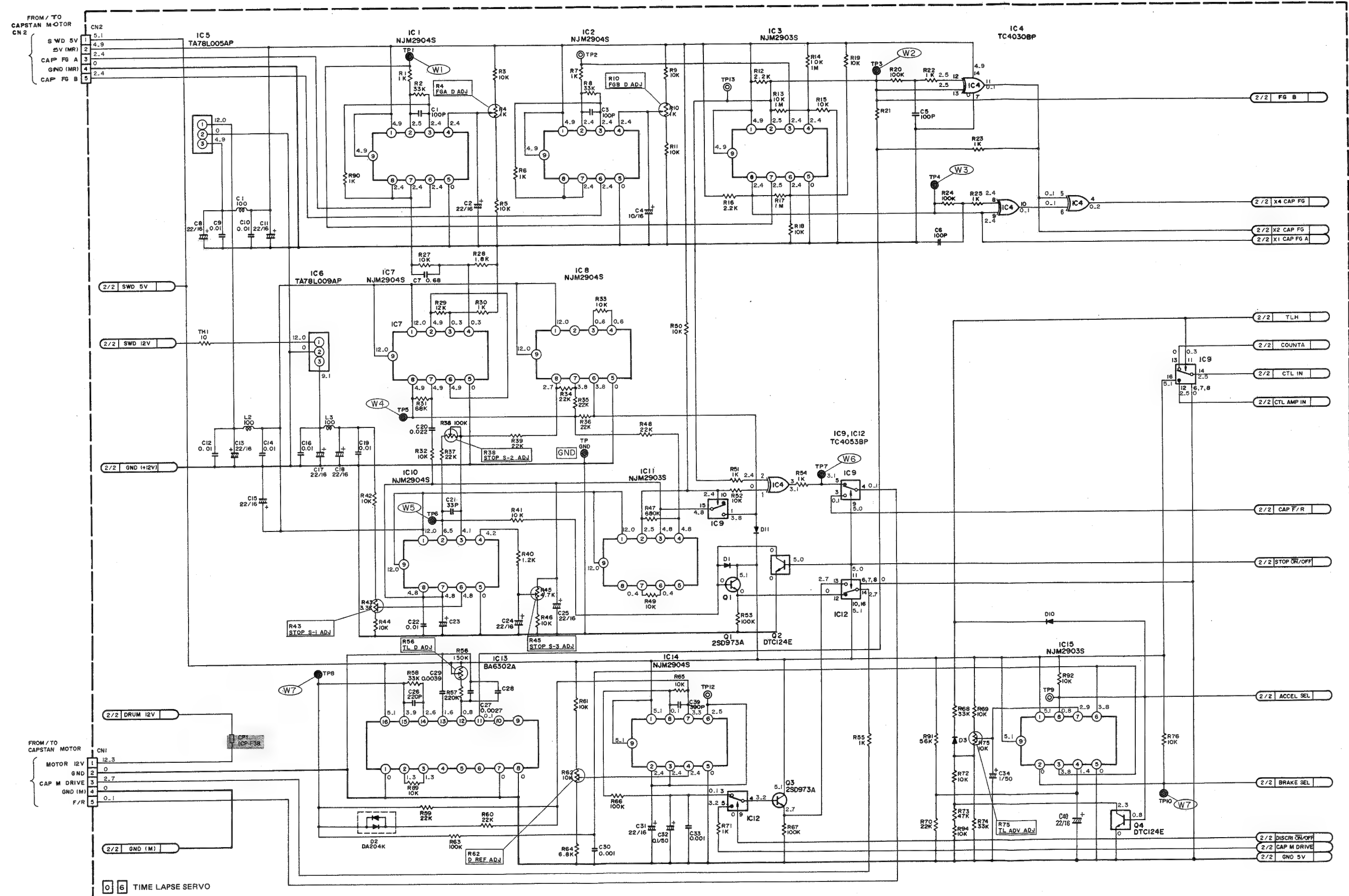
- FRONT -



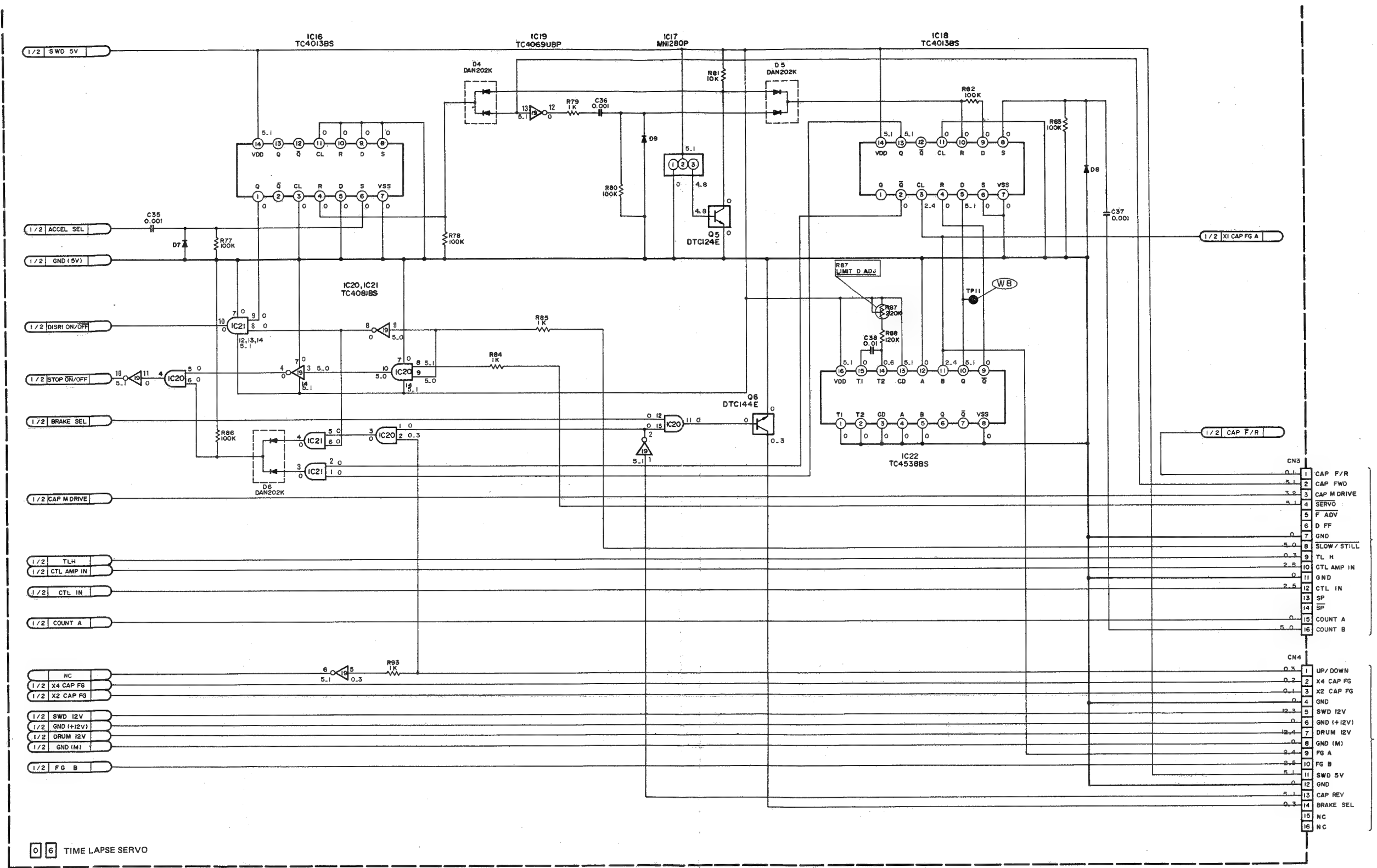
- MAIN WAVEFORMS OF TIME LAPSE SERVO CIRCUIT -



# 4.20 TIME LAPSE SERVO SCHEMATIC DIAGRAM (1/2)



– TIME LAPSE SERVO SCHEMATIC DIAGRAM (2/2) –



FROM / TO 0 7  
M CTL  
CN 3

FROM / TO 0 7  
M CTL  
CN 4



6

## 4.21 MECHACON SCHEMATIC DIAGRAM (1/2)

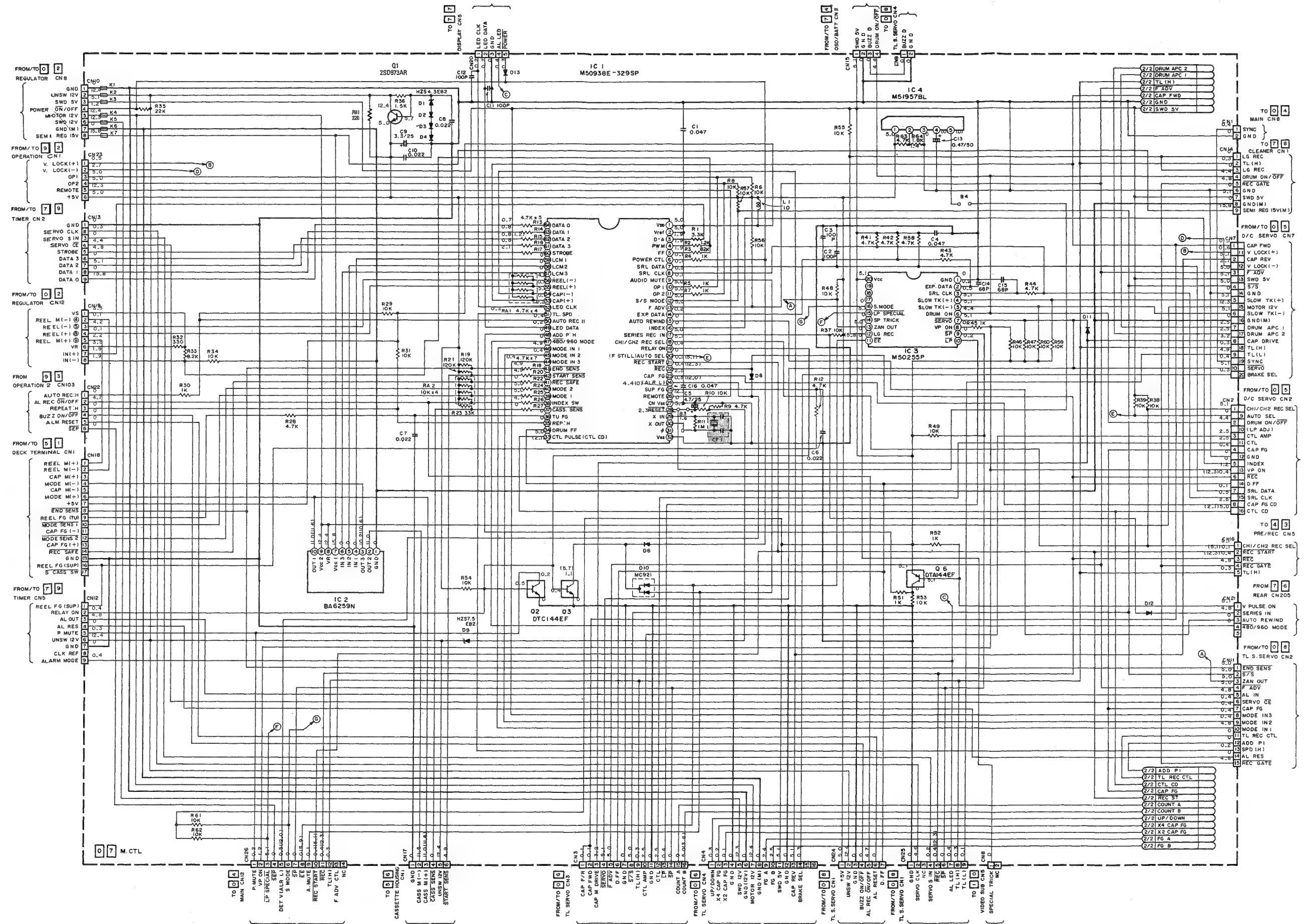
5

4

3

2

1



4-25

4-25

E

F

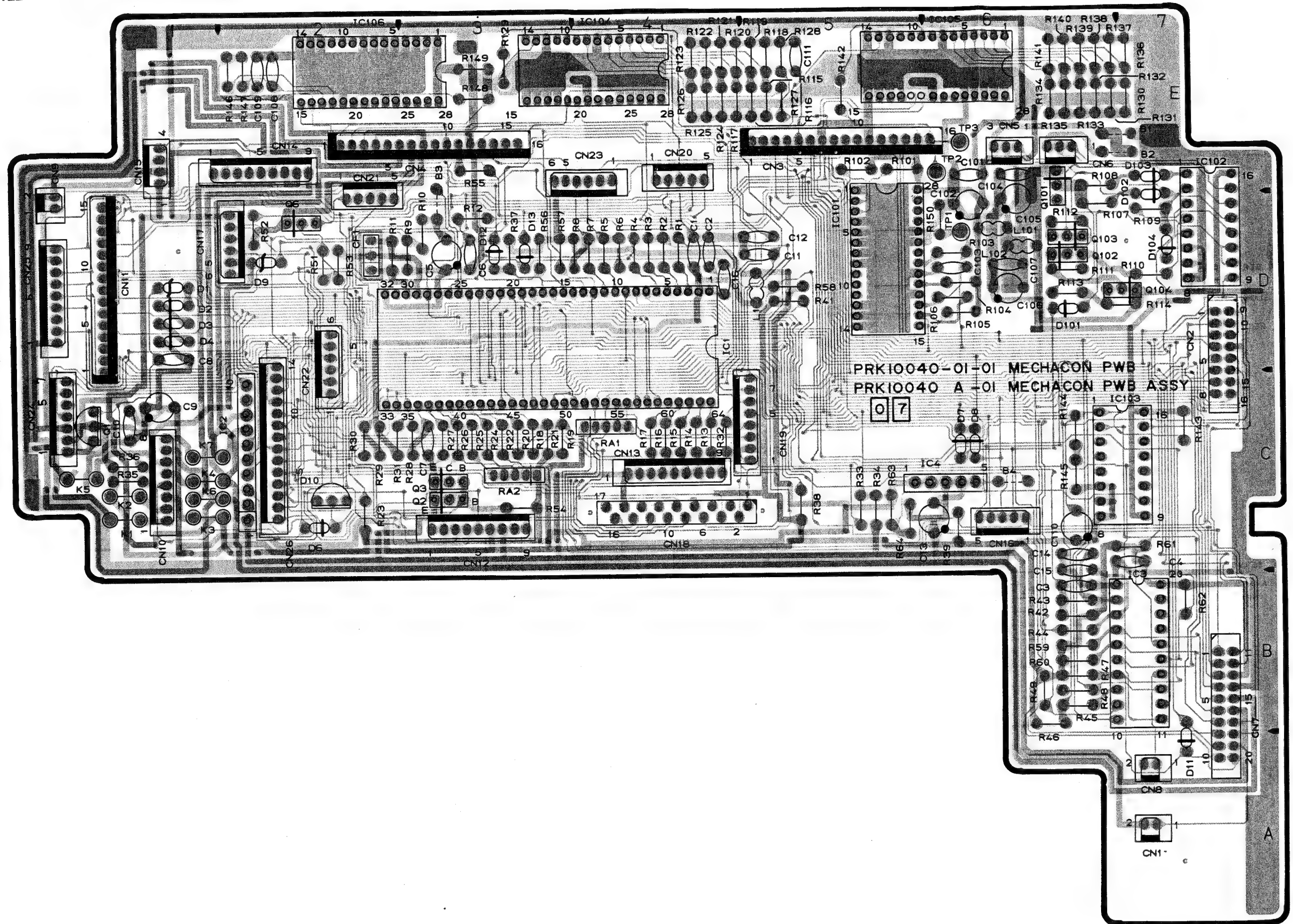
G

H

## 1

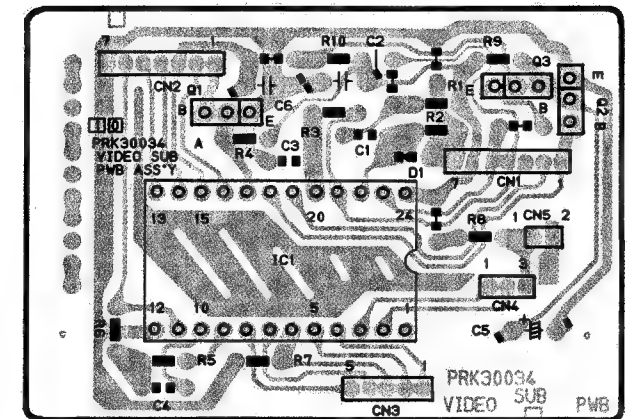
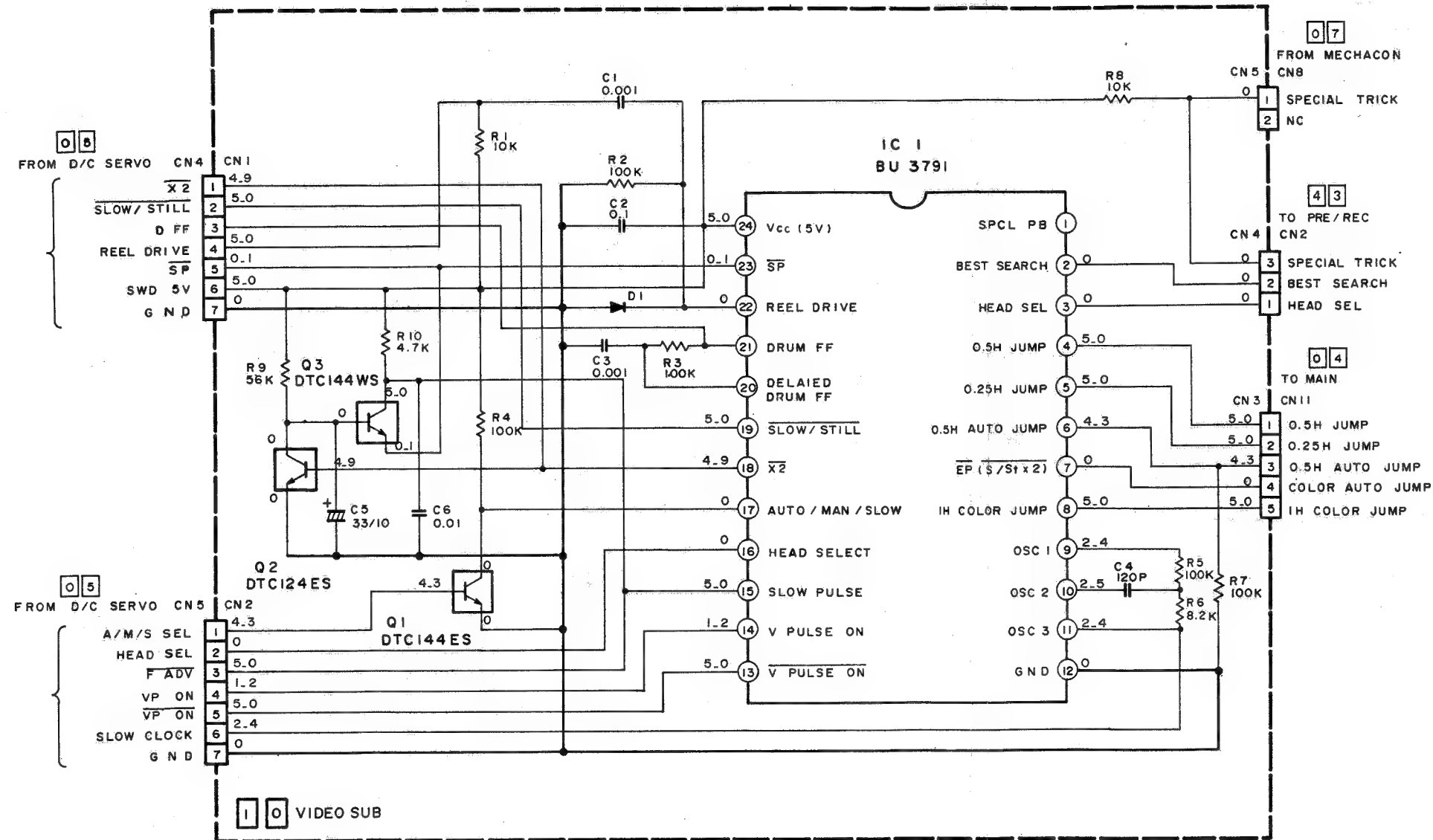


# 4.22 MECHACON CIRCUIT BOARD

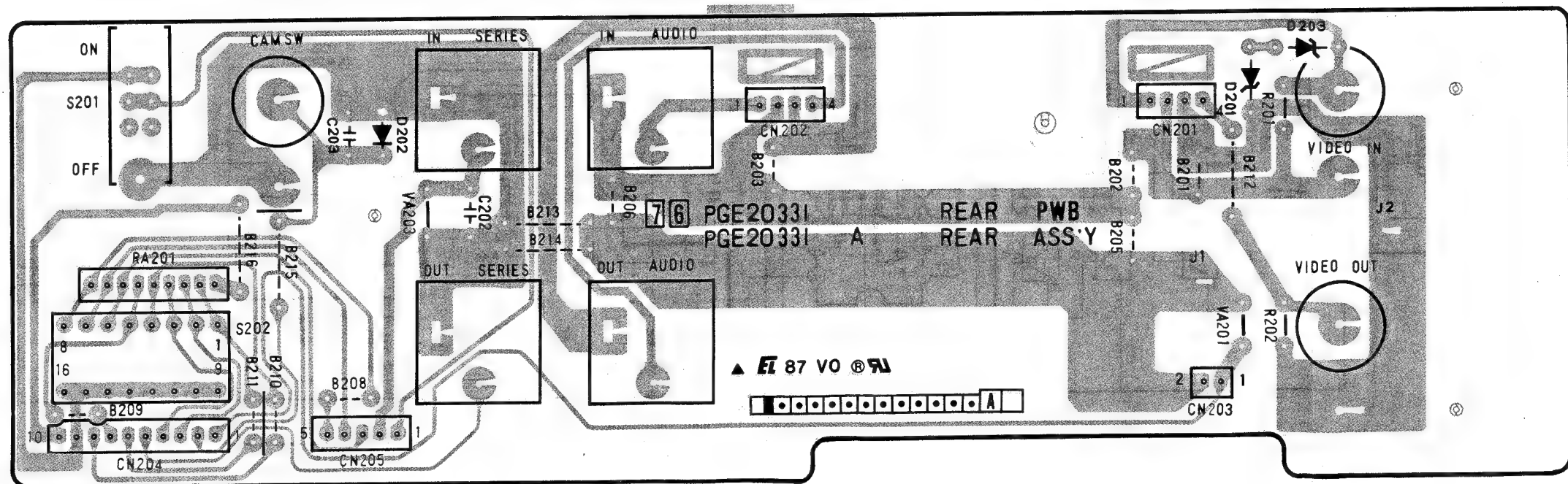
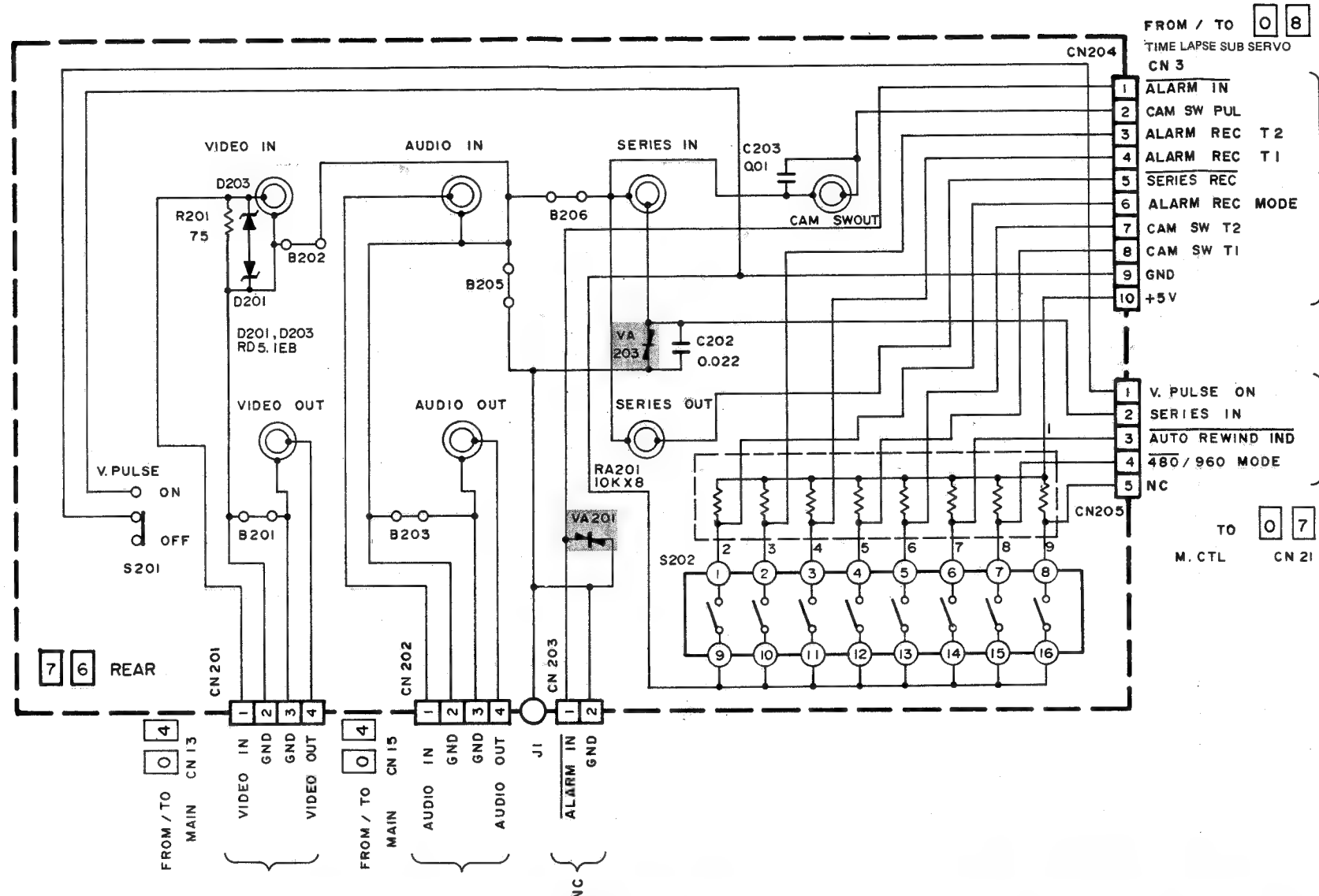




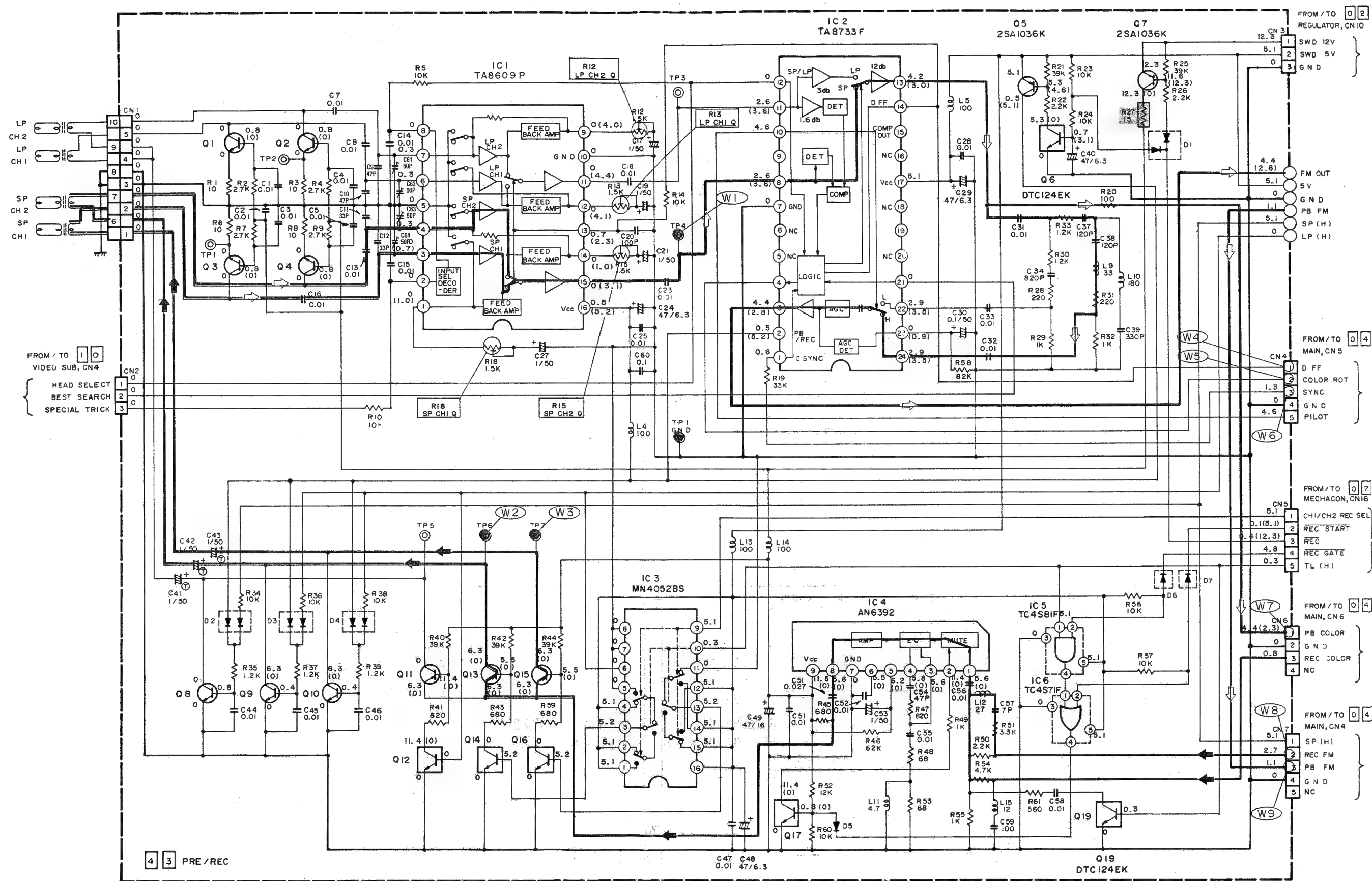
# 4.23 VIDEO SUB SCHEMATIC DIAGRAM & CIRCUIT BOARD



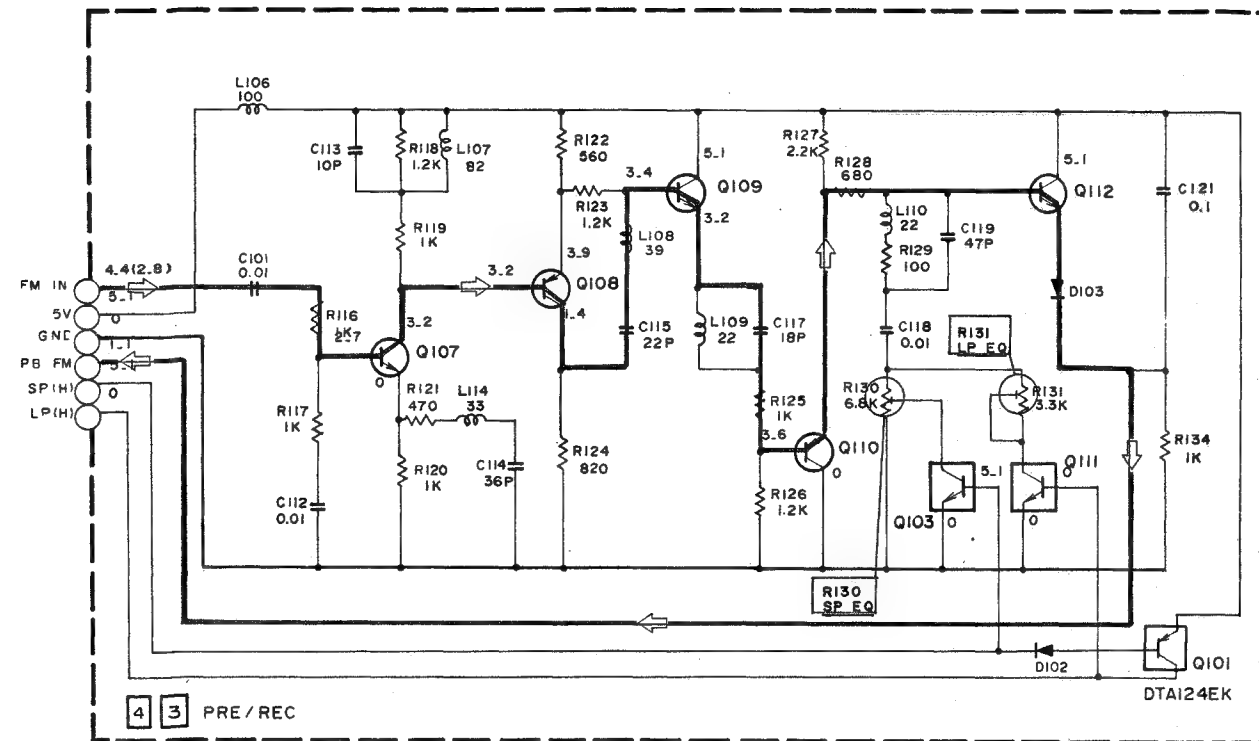
4.24 REAR SCHEMATIC DIAGRAM & CIRCUIT BOARD



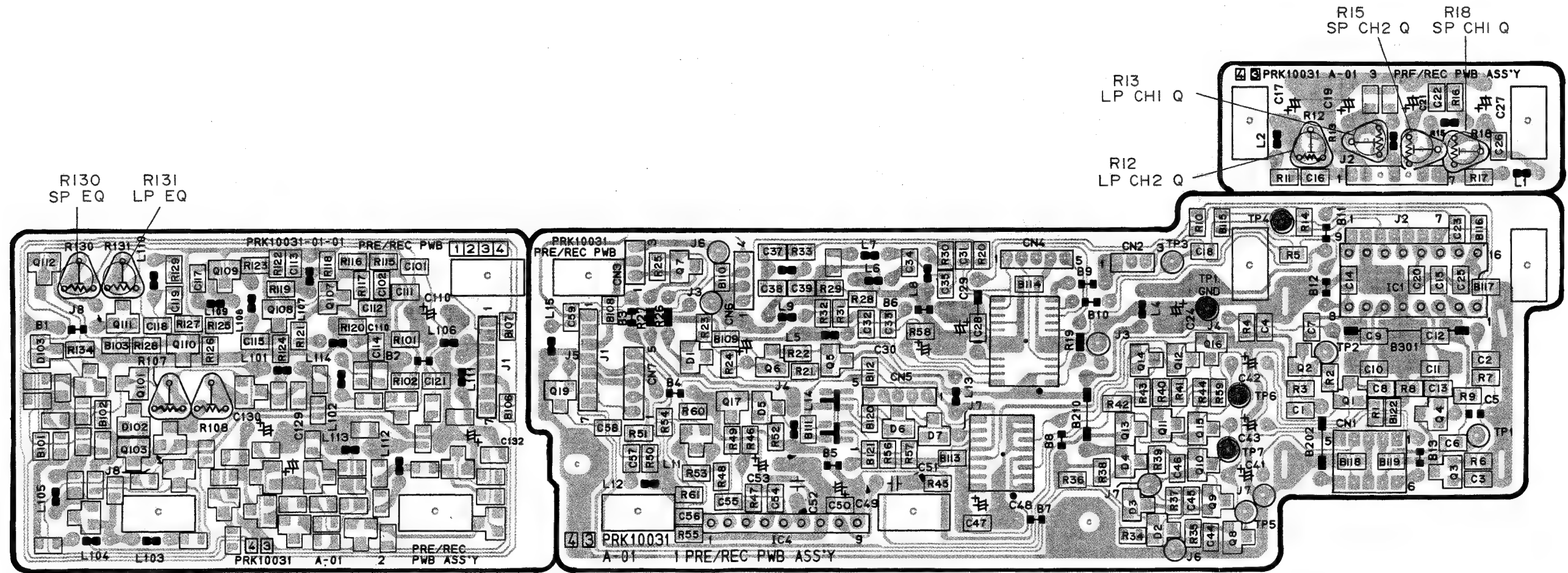
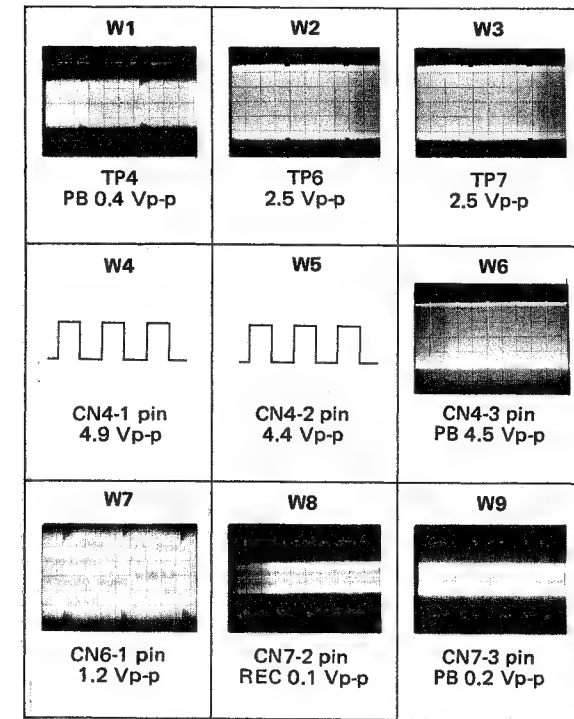
# 4.25 VIDEO PRE/REC SCHEMATIC DIAGRAM (1/2)



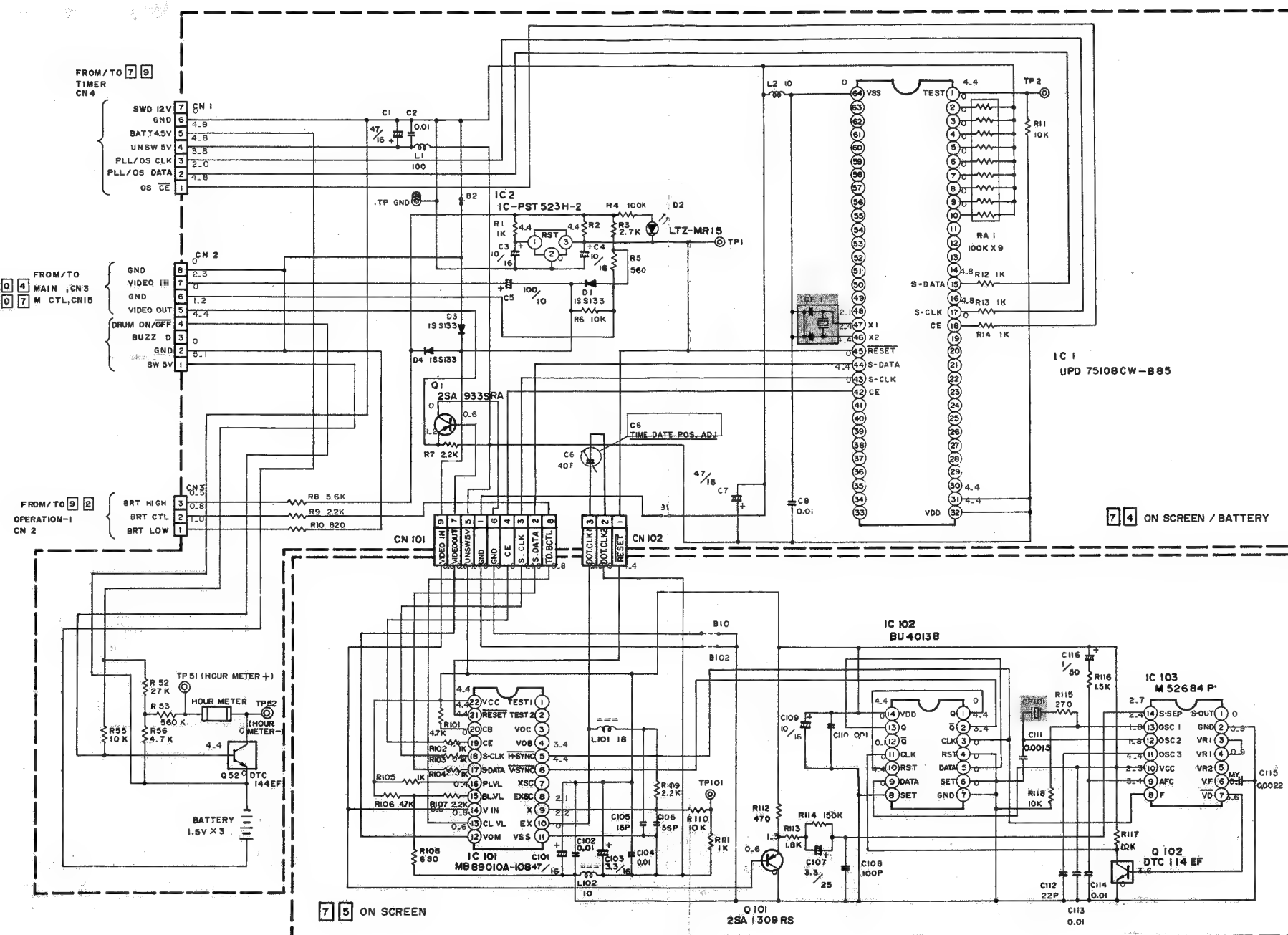
4.26 VIDEO PRE/REC SCHEMATIC DIAGRAM (2/2) & CIRCUIT BOARD



— MAIN WAVEFORMS OF VIDEO PRE/REC CIRCUIT —



# 4.27 ON SCREEN DATA/BATTERY SCHEMATIC DIAGRAM





6

4.28 ON SCREEN DATA/BATTERY CIRCUIT BOARD

5

4

3

2

1

A

B

C

4-33

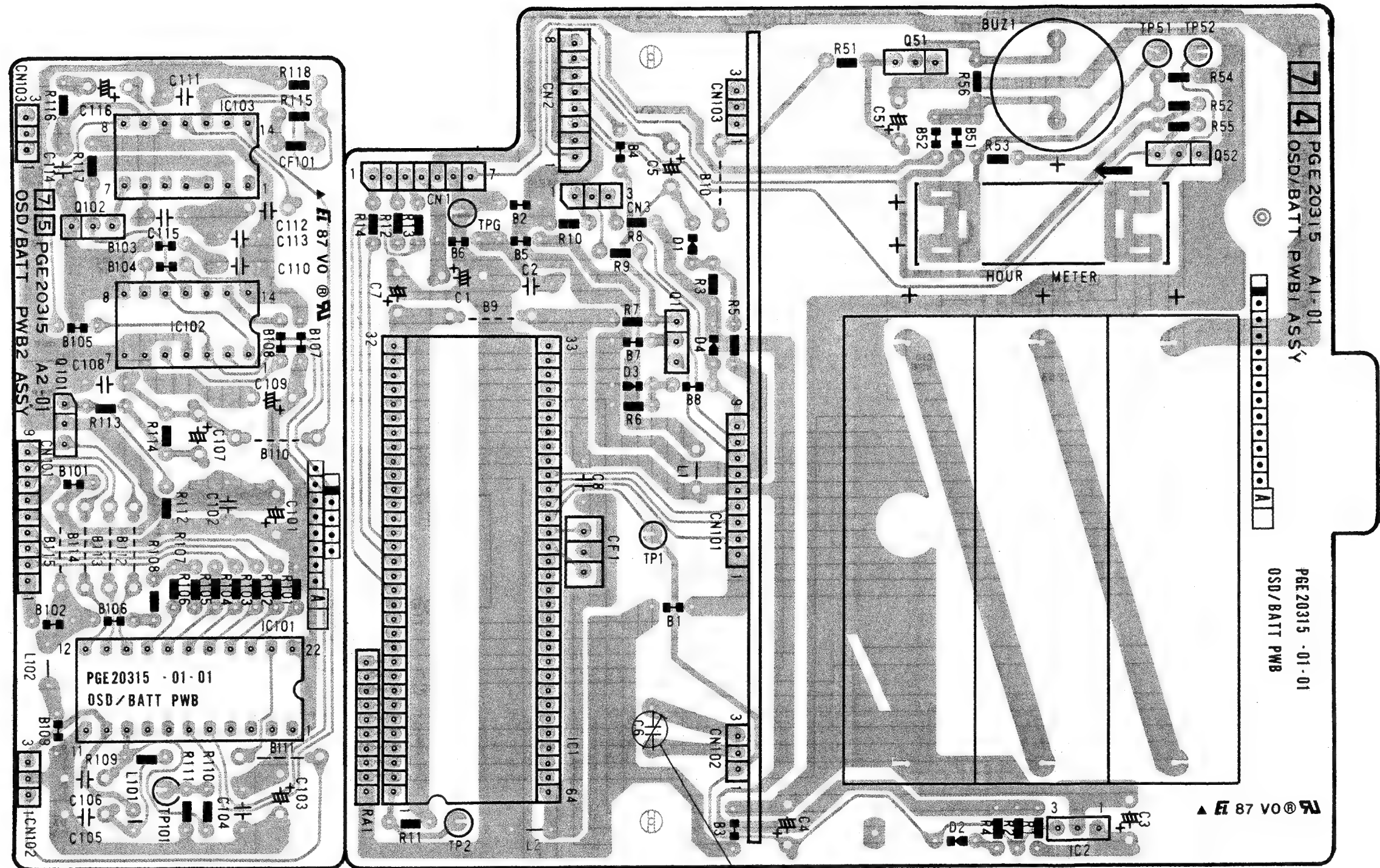
4-33

E

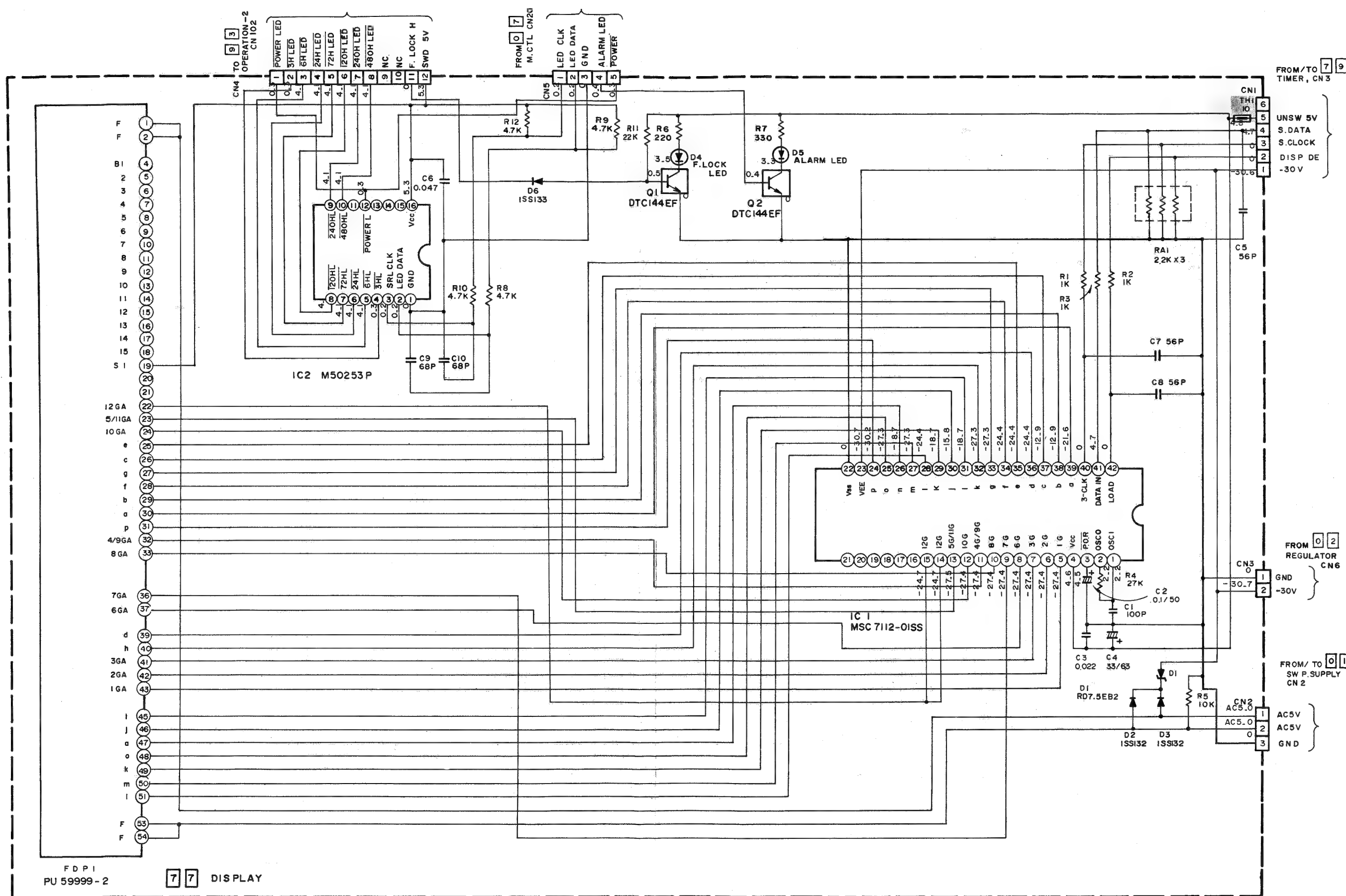
F

G

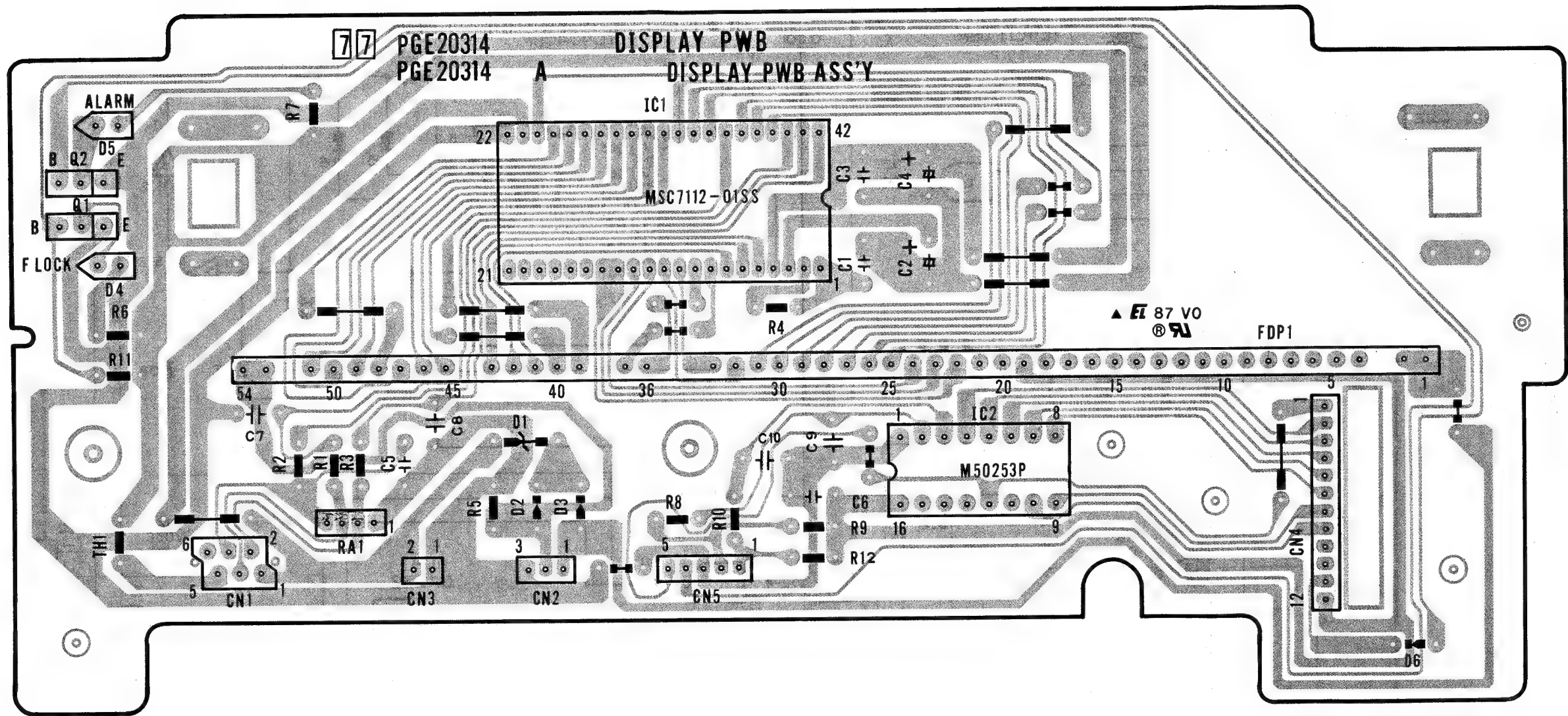
H



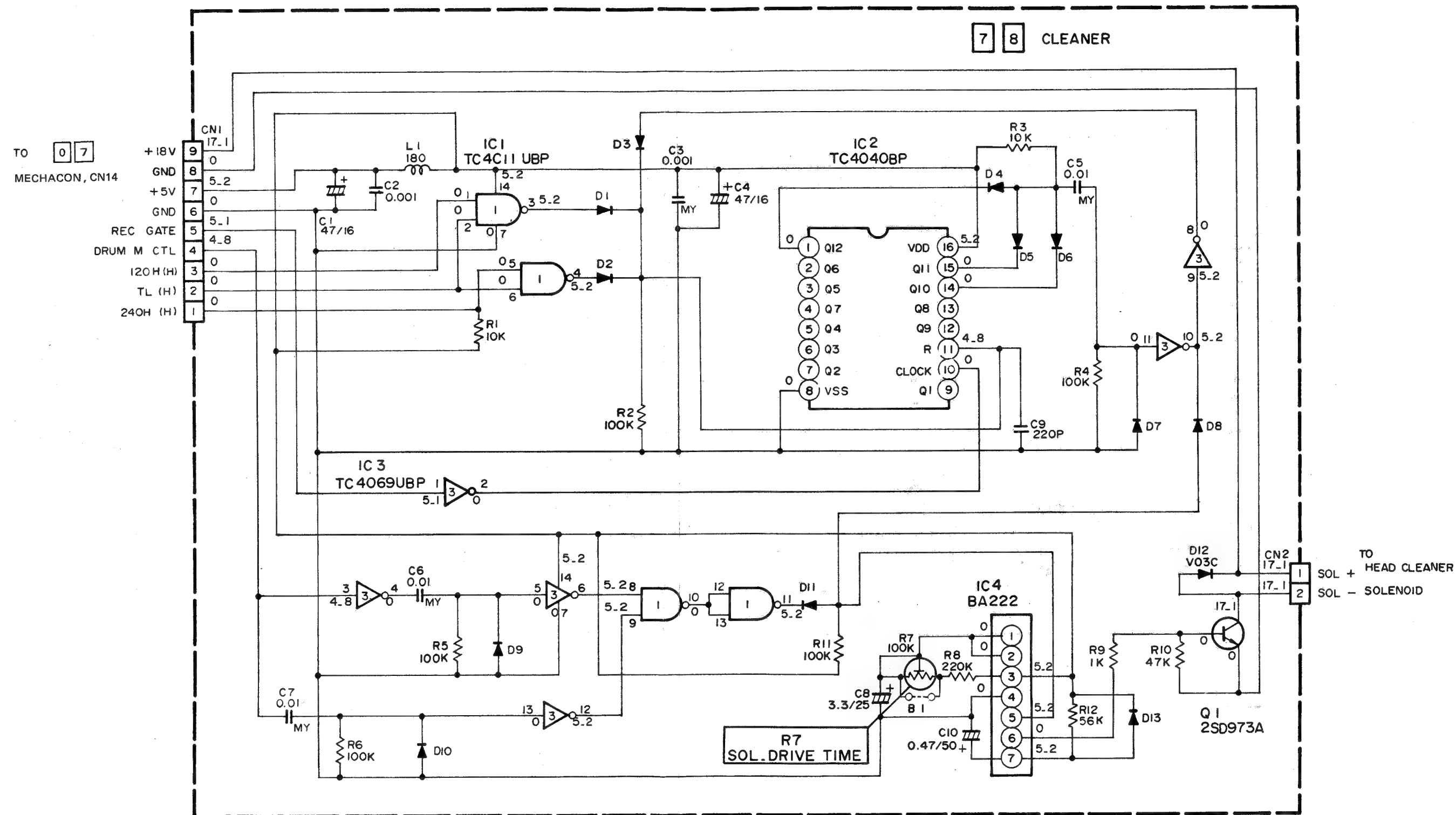
# 4.29 DISPLAY SCHEMATIC DIAGRAM



4.30 DISPLAY CIRCUIT BOARD



# 4.31 CLEANER SCHEMATIC DIAGRAM





6

4.32 CLEANER CIRCUIT BOARD

5

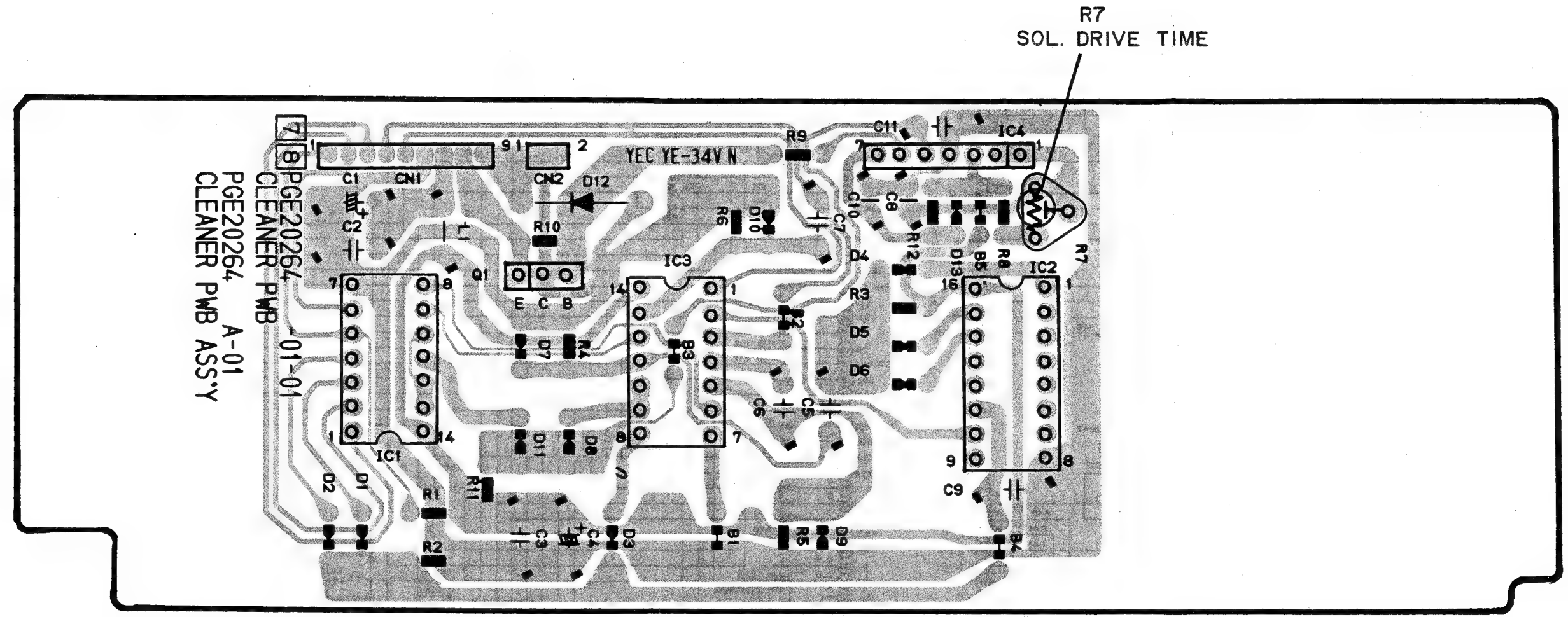
4

3

2

1

A B C 4-37 4-37 E F G H



PGE20264 A-01  
CLEANER PWB ASS'Y  
PGE20264 -01-01  
CLEANER PWB

## 6



**7 9** TIMER

B

4-38

4-38

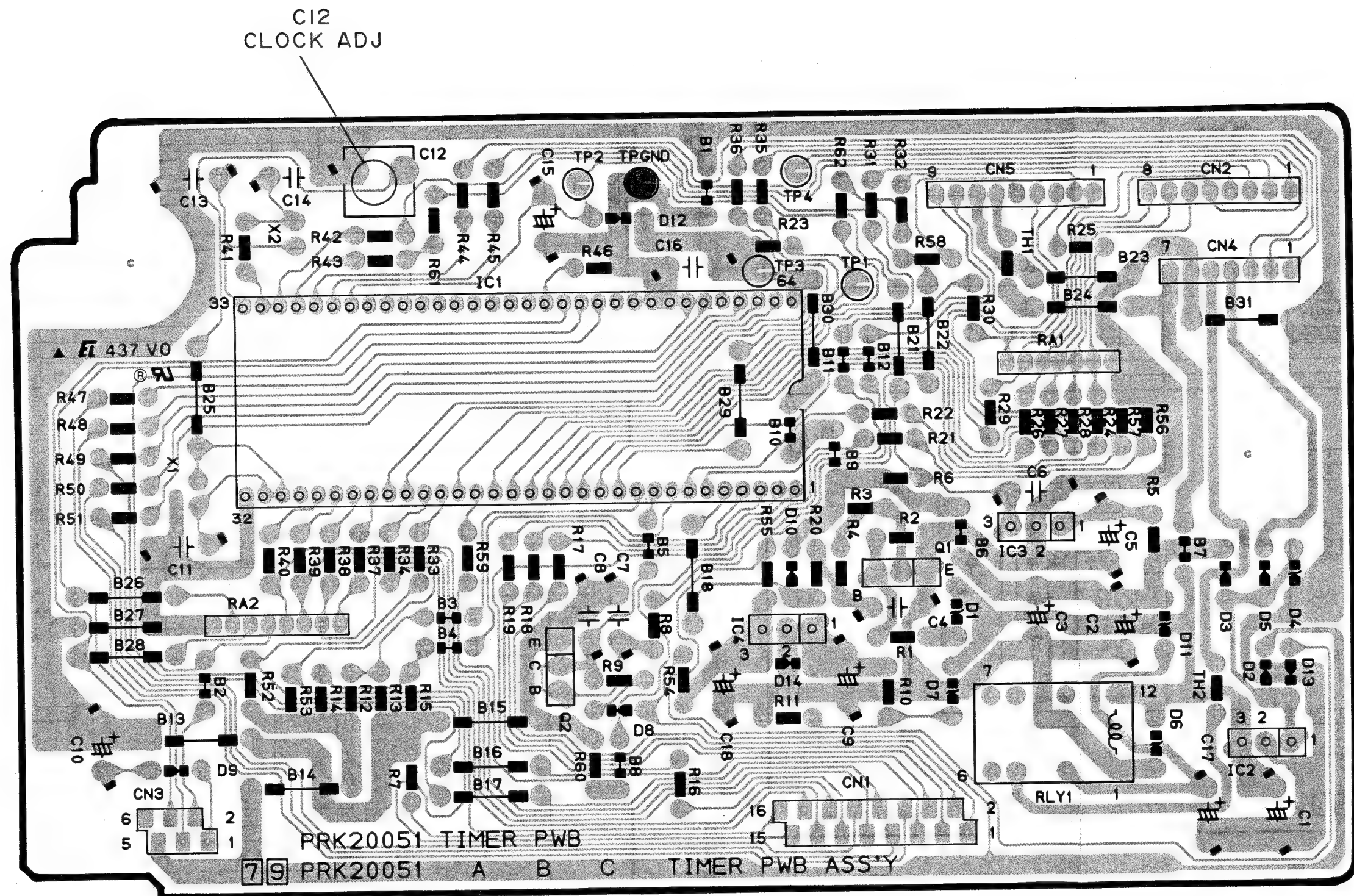
E

F

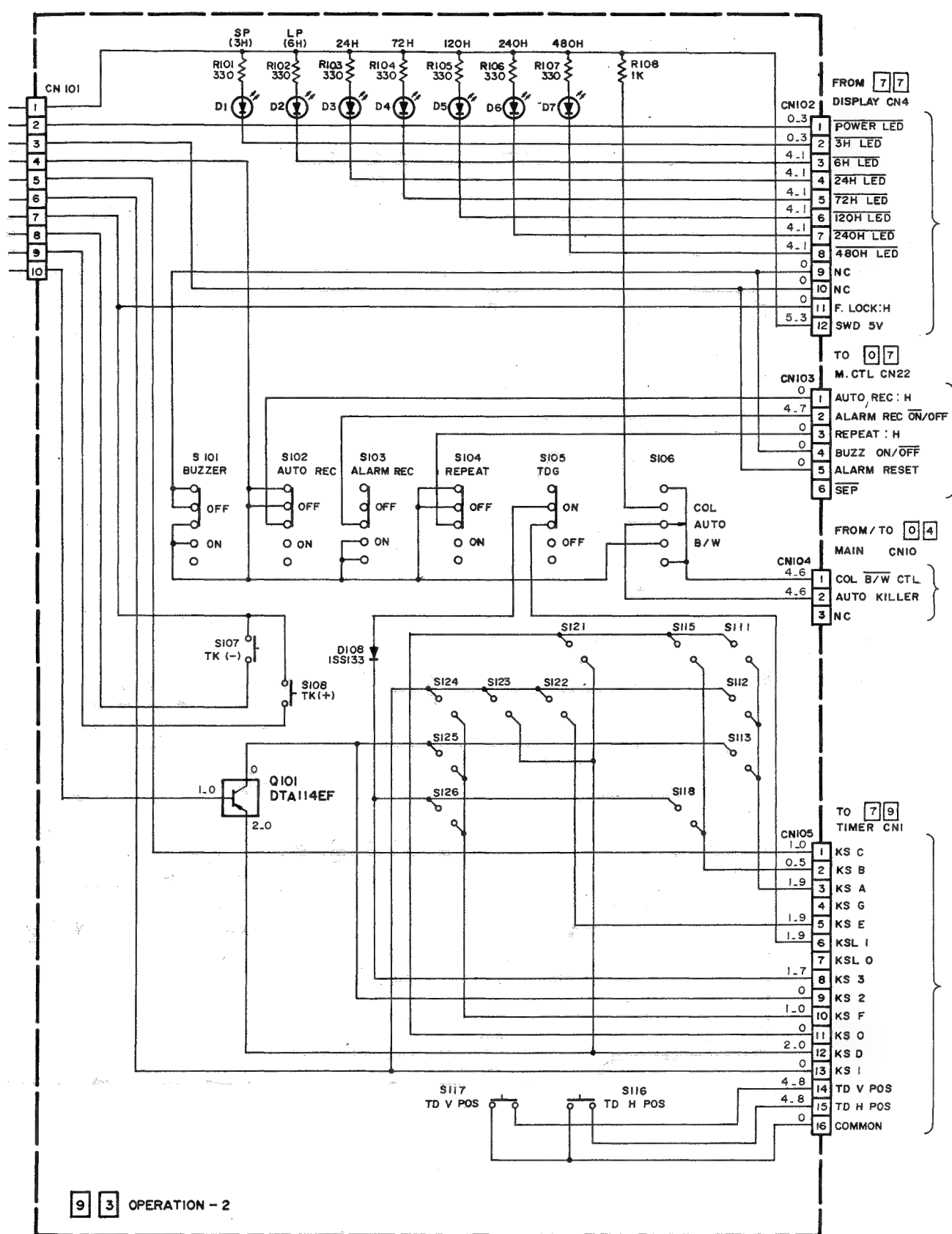
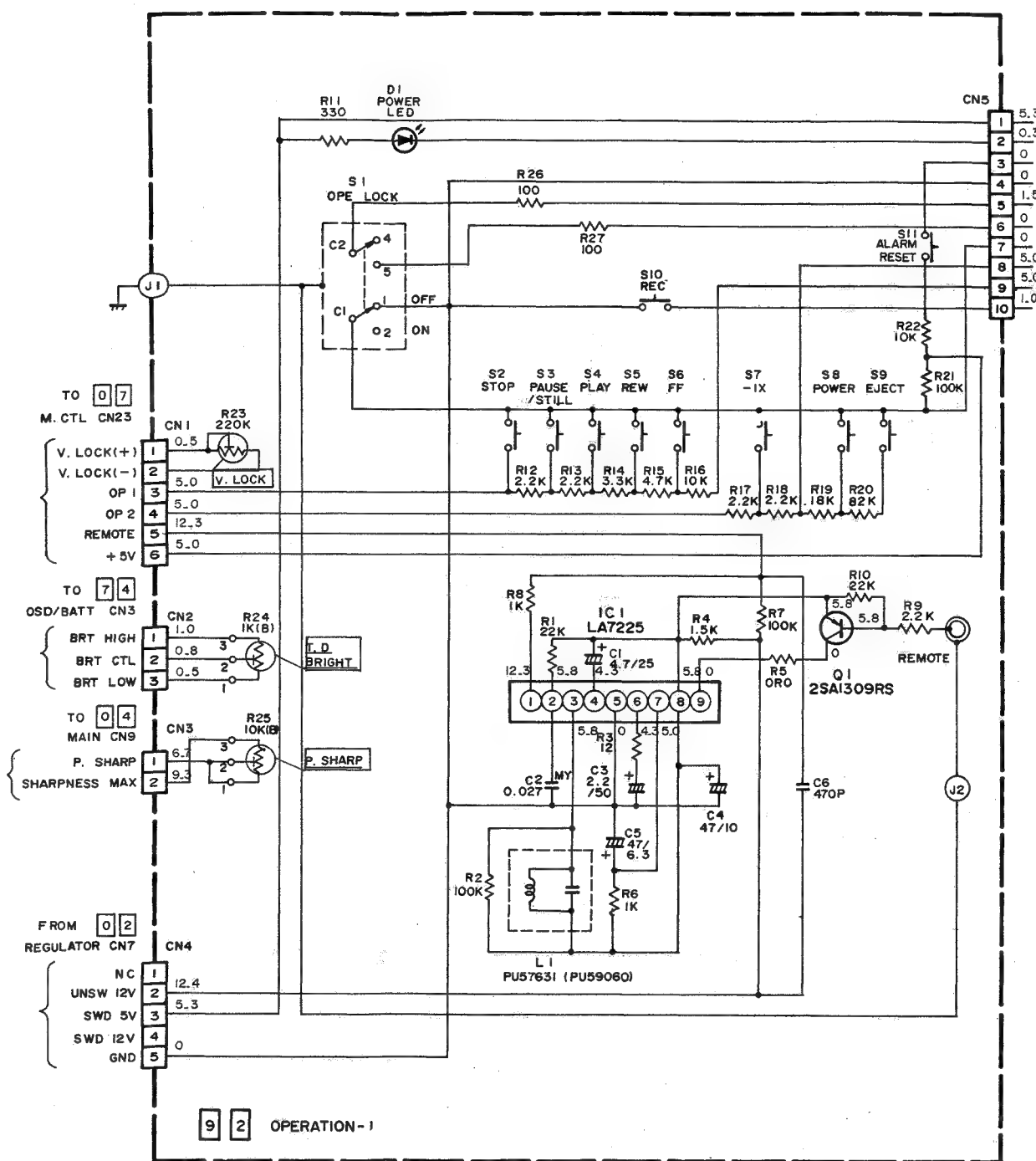
©

H

4.34 TIMER CIRCUIT BOARD

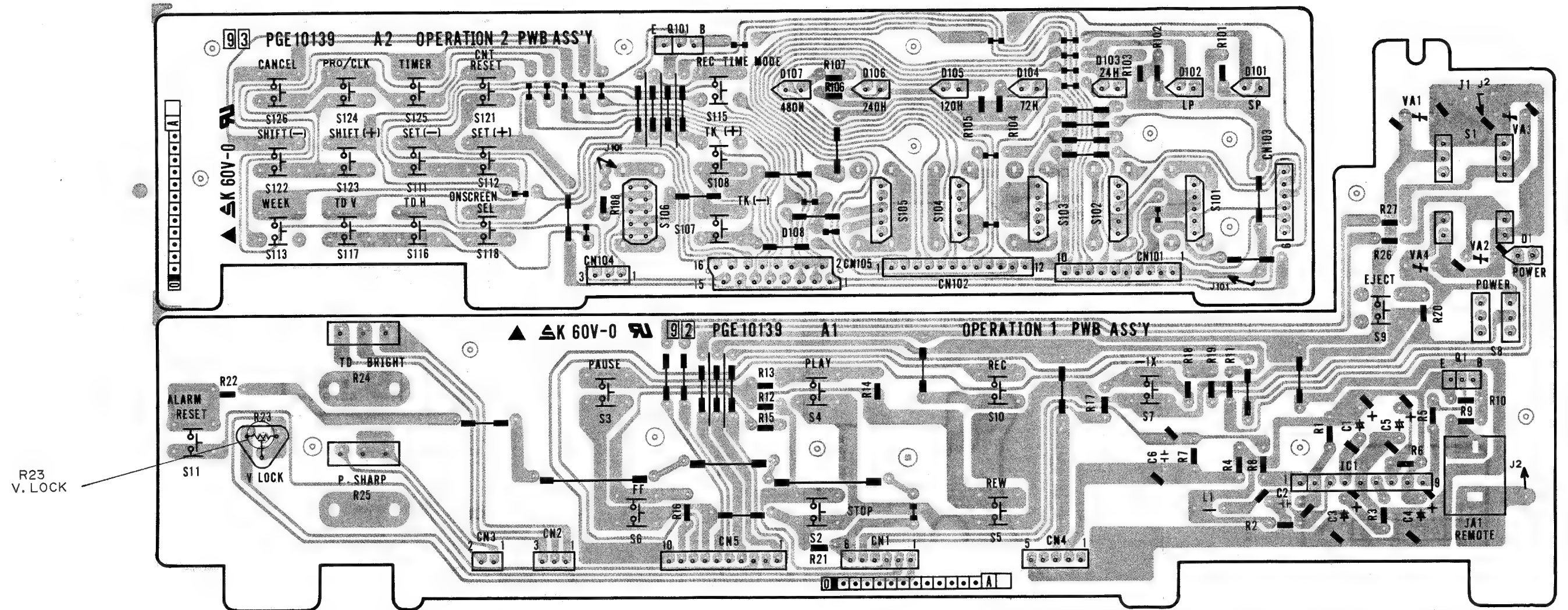


# 4.35 OPERATION SCHEMATIC DIAGRAM





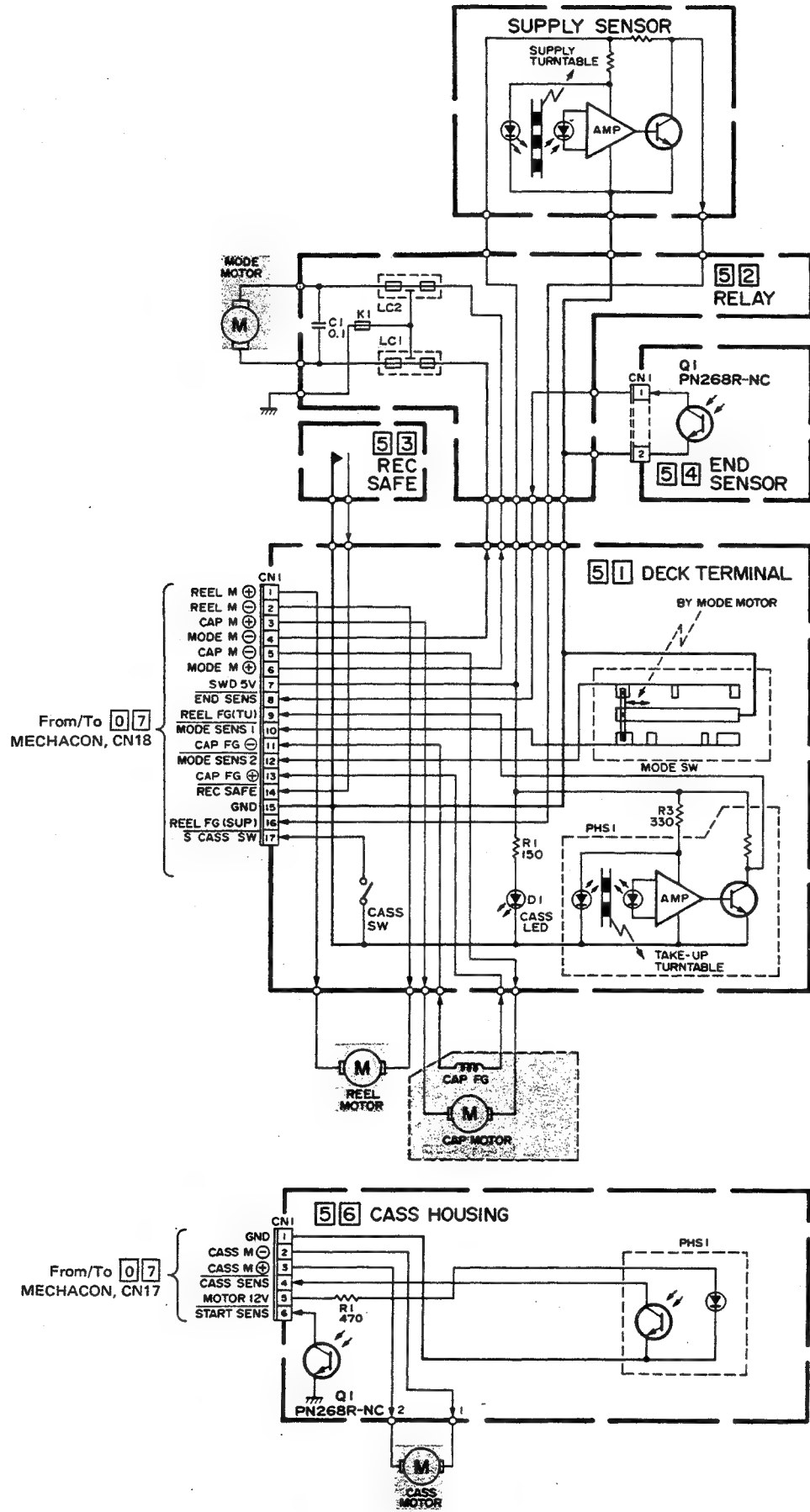
# 4.36 OPERATION CIRCUIT BOARD



## 6

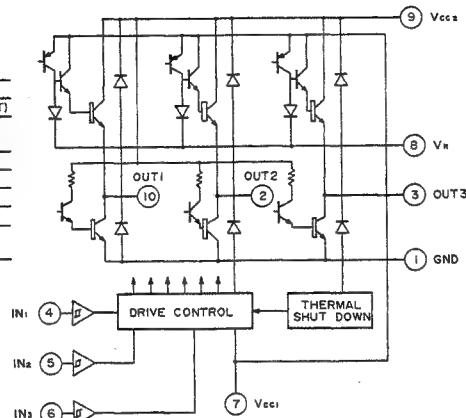
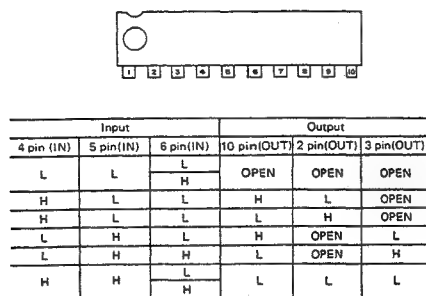


4.38 DECK TERMINAL SCHEMATIC DIAGRAMS



## 4.39 IC BLOCK DIAGRAMS

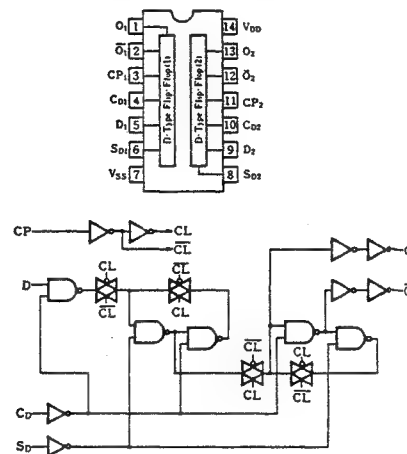
### — BA6259 —



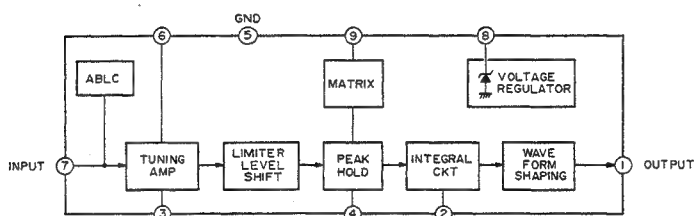
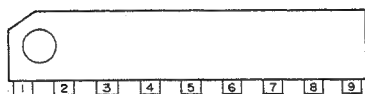
### — BU4013B —

### — TC4013BP —

### Dual D-type Flip-Flop



### — LA7225 —

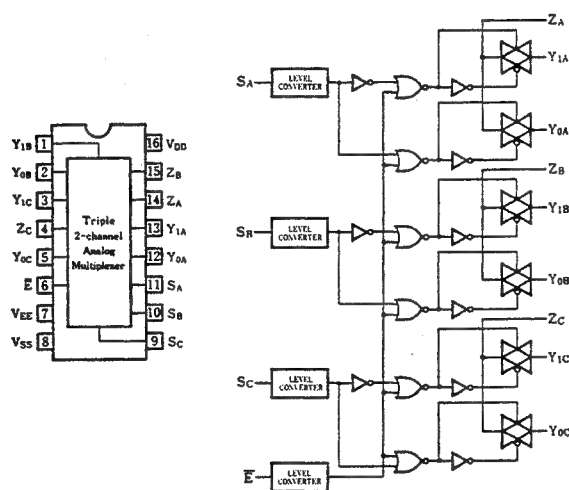


### — MN4053B —

### — TC4053BP —

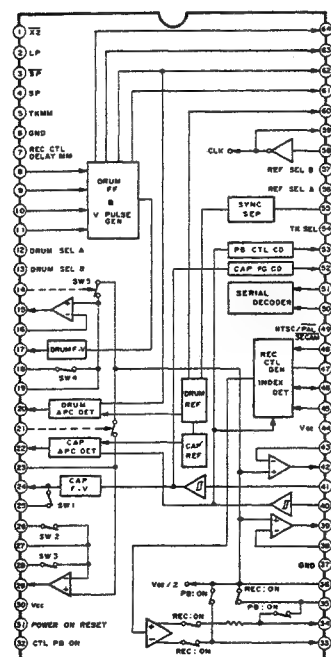
### — TC4053PS —

### Type 2 Channel Analog Multiplexer



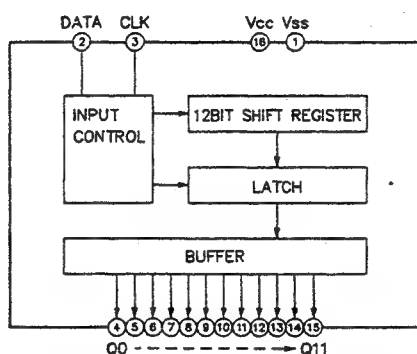
### — HD49722NT —

### VTR Servo Control



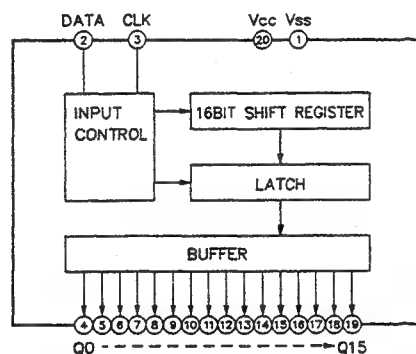
### — M50253P —

### 12-bit serial data are parallel converted IC

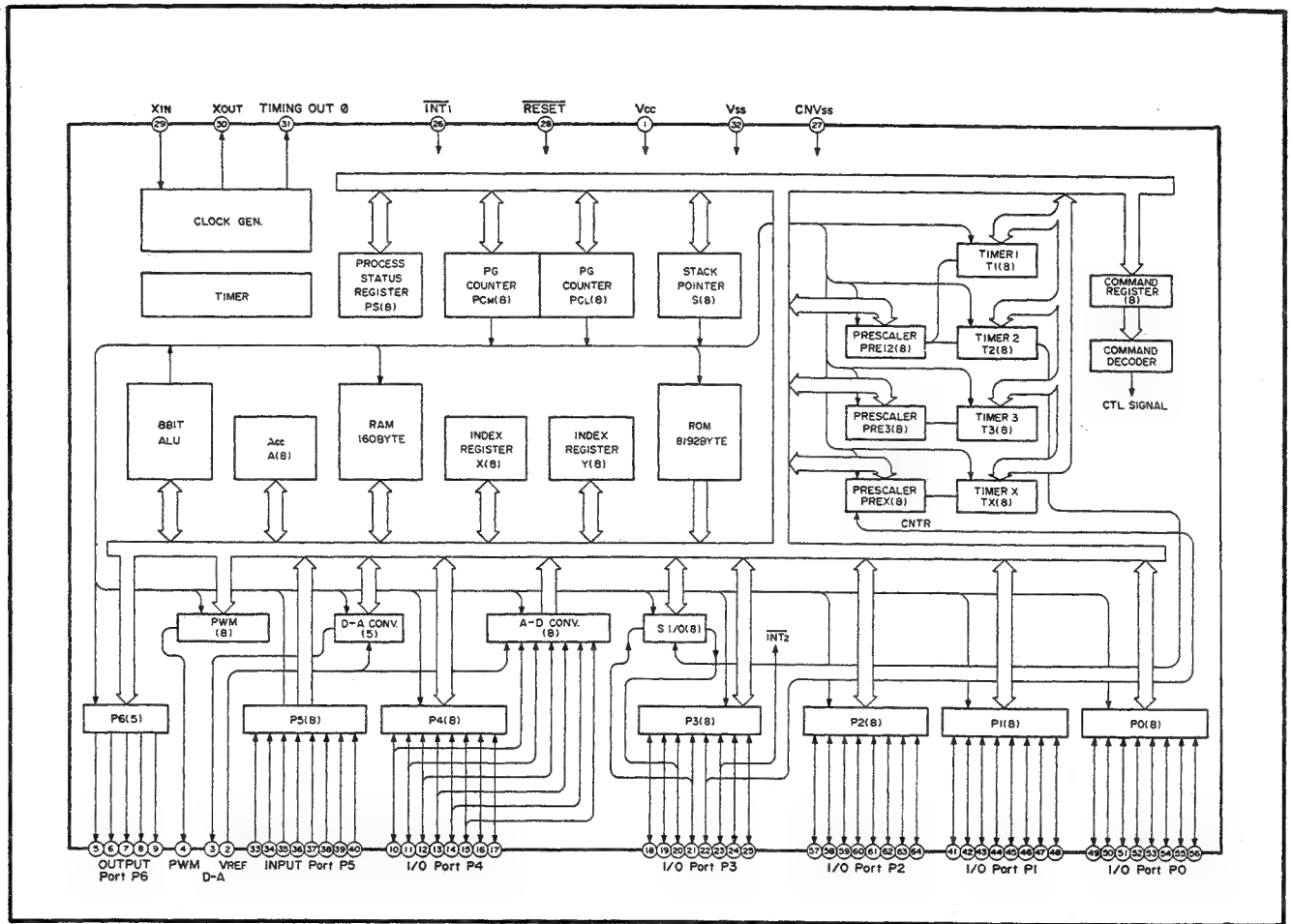


### — M50255P —

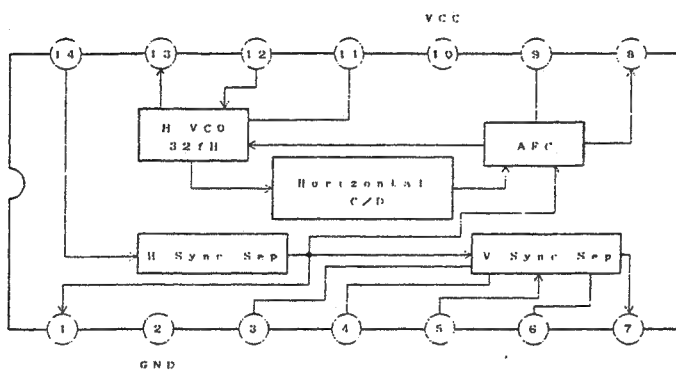
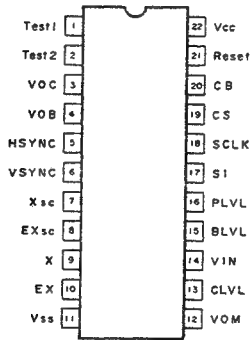
### 16-bit serial data are parallel converted IC



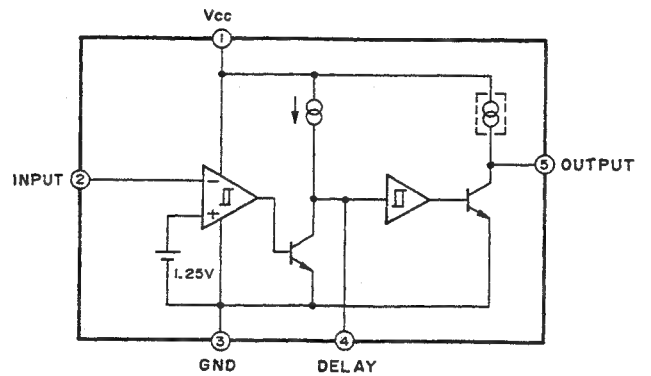
**— M50938E-329SP —**  
Single Chip 8-bit Microprocessor



**— M52684AP —**



**— M51957BL —**



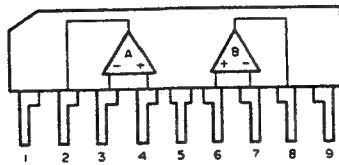
**— M5278L56 —**  
Regulator



- ① OUT
- ② COMMON
- ③ IN

— NJM2903S —  
Dual Compalator

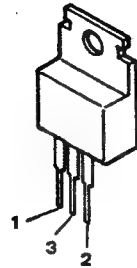
— NJM2904S —  
Dual Operation Amplifier



- 1 V<sup>+</sup>
- 2 A OUTPUT
- 3 A- INPUT
- 4 A+ INPUT
- 5 V<sup>-</sup>
- 6 B+ INPUT
- 7 B- INPUT
- 8 B OUTPUT
- 9 V<sup>+</sup>

— TA78L005AP —  
Regulator

— TA78L009AP —  
Regulator



- 1. INPUT
- 2. OUTPUT
- 3. GND

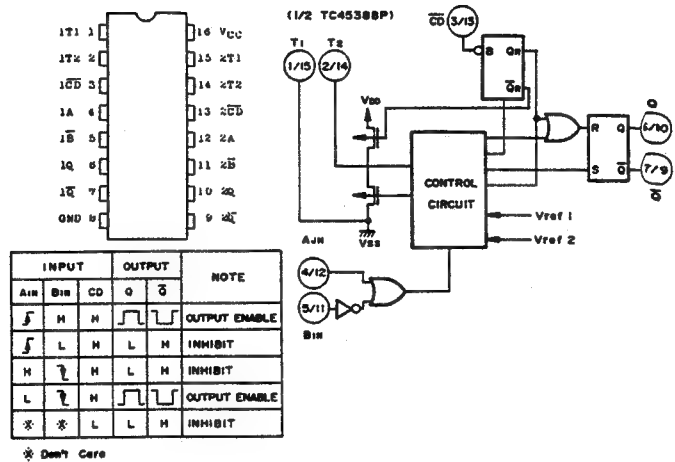
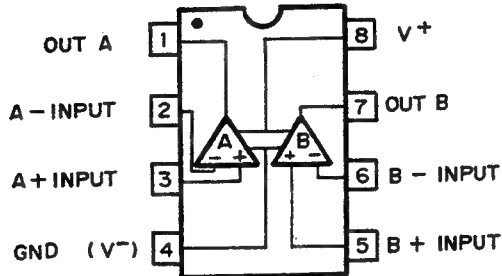
Pin1 IN  
Pin2 OUT  
Pin3 COMMON



— TC4538BP —

Dual Precision Retriggerable/Ressettable Monastable Multivibrator

— UPC393C —  
Dual Comparator

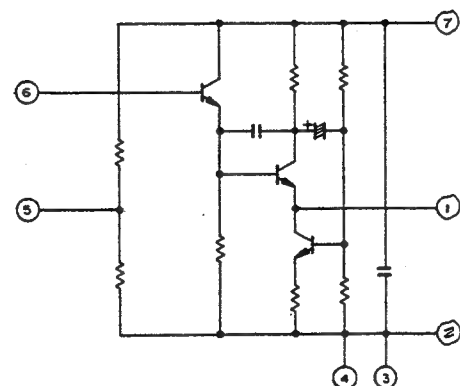
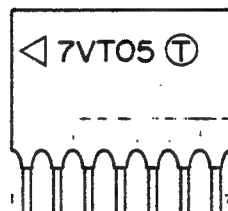
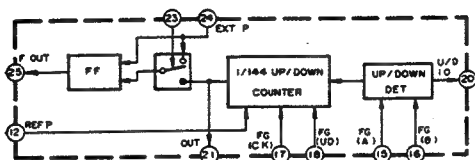


INPUT		OUTPUT		NOTE
Ain	Bin	Q	Q̄	
H	H	H	L	OUTPUT ENABLE
L	H	L	H	INHIBIT
H	L	H	L	INHIBIT
L	L	L	H	OUTPUT ENABLE
X	X	L	L	INHIBIT

\* Don't Care

— 7VT05 —  
Driver


— VC2032 —



## SECTION 5

### EXPLODED VIEWS AND PARTS LIST

#### SAFETY PRECAUTION

Parts identified by the  symbol are critical for safety.  
Replace only with specified part numbers.

	Page
5.1 STANDARD PART NUMBER CODING	
5.1.1 Screw coding .....	5 - 2
5.1.2 Fuse coding .....	5 - 3
5.2 EXPLODED VIEWS AND PARTS LIST	
5.2.1 Packing assembly .....	5 - 3
5.2.2 Cabinet assembly .....	5 - 4
5.2.3 Chassis assembly .....	5 - 5
5.2.4 Mechanism (1) assembly .....	5 - 6
5.2.5 Mechanism (2) assembly .....	5 - 6

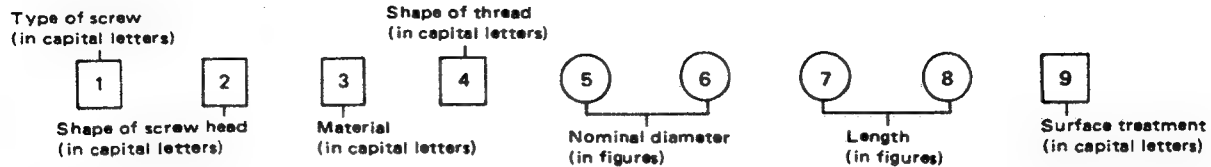
Note: " X " indicates quantity per set.



## 5.1 STANDARD PART NUMBER CODING

### 5.1.1 Screw coding

Standard screw part numbers are as follows.



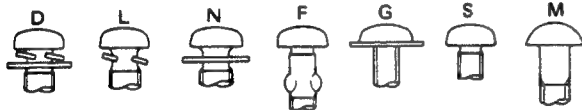
#### Type of screw (first digit)

- S Normal screws
- D Assembled machine screws (with plain and spring washers)
- L " (with spring washer)
- N " (with plain washer)
- F Feather screws
- G Washer head tapping screws
- M Wood screws

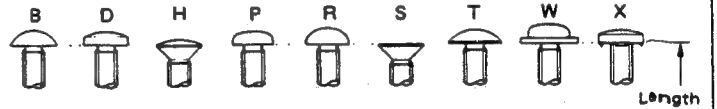
#### Shape of screw head (second digit)

- B Brazier head
- D Binding head
- H Oval countersunk head
- P Pan head
- R Round head
- S Flat head
- T Truss head
- W Washer head (machine screws)
- X Toothed head

#### — Type of screw (first digit) —



#### — Shape of screw head (second digit) —



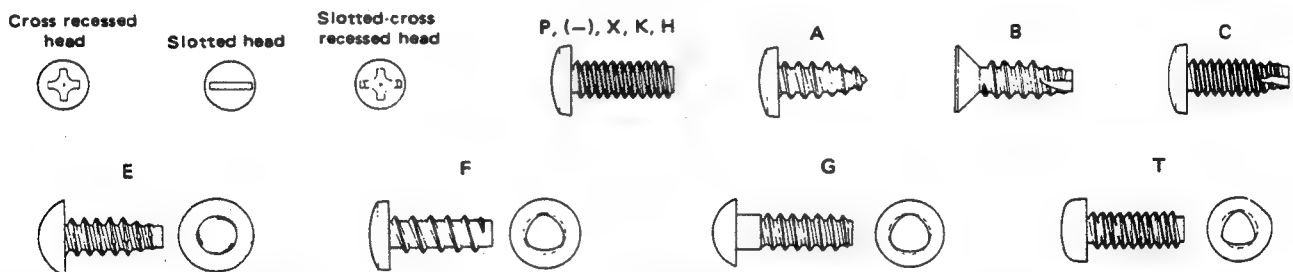
#### Material (third digit)

- S Steel
- E Stainless steel
- C Cast iron
- U Copper
- B Brass
- P Phosphor bronze
- N Nickel silver
- Y Cast brass
- A Aluminum
- Z Zinc alloy
- K Polycarbonate

#### Shape of thread (fourth digit)

- P Cross recessed head screws
- (-) Slotted head machine screws
- X Slotted-cross recessed head machine screws
- K Cross recessed head machine screws for precision equipment (type 1)
- H " (type 3)
- A Cross recessed head tapping screws (type 1)
- B " (type 2)
- C " (type 3)
- E Cross recessed head special tapping screws (brand : evertight)
- F " (brand : P-tight)
- T " (brand : taptight)
- G " (brand : taptight)

#### — Shape of thread (fourth digit) —



#### Nominal diameter (fifth and sixth digits)

The fifth and sixth digits are numbers indicating a nominal diameter or dimension. If the dimension exceeds 10 mm, three digits are used. The number indicates a nominal diameter or dimension, given in millimeters, multiplied by ten.

#### Length (seventh and eighth digits)

The seventh and eighth digits are numbers indicating length in millimeters. The preceding figure is zero when the dimension is smaller than 10 mm. For machine screws used in precision equipment whose length is given in units of 0.1 mm, the number indicates ten times the size of their length.

#### Surface treatment (ninth digit)

- Z Dichromate treatment after galvanizing (MFZn II-C)
- N Nickel plating (MFNi II, MFNi I)
- R Chromium plating (MBCr II, MBCr I)
- G Silver plating (SP4)
- B Black coating after plating
- F Blackening of iron (FB)
- M Blackening after galvanizing
- K Pickling of brass (PF2)
- P Phosphate treatment
- W Uni-chrome plating
- L Coating with transparent paint
- A Coloring red after galvanizing (MFZn II-C)
- C Coloring blue after galvanizing (MFZn II-C)
- T Coloring green after galvanizing (MFZn II-C)
- V Coloring purple after galvanizing (MFZn II-C)

#	REF NO.	PART NO.	PART NAME, DESCRIPTION	#	REF NO.	PART NO.	PART NAME, DESCRIPTION
*****				*****			
			*****				*****
			* 4. MECHANISM ASSY <M4> *				*****
			*****				*****
1		PQ43710A	TENSION ARM ASSY	61		PQ42001	WINDMILL
1A		PQ41952-5	SPRING	62		PQ42002	CLUTCH SPRING
2		PQ41948A	TENSION BAND ASSY	63		PQ42003	WORM SHAFT
3		SDST2606Z	SCREW	64		PQM30017-5	SLIT WASHER, X2
4		PQ43330C	FULL ERASE HEAD ASSY	65		PQM30003-20	BELT
5		PU60646	FULL ERASE HEAD	66		PQM30018-22	SPACER
6		PQ43299B	FULL ERASE HEAD SUB ASSY	67		PU61088	REEL SENSOR(S)
7		PQ43837A	ROLLER ASSY	68		LPSP2604Z	ASSY SCREW
8		PQ43836	RING	69		SPST2606Z	SCREW, X2
9		PQM30017-25	SLIT WASHER	70		SPST2606Z	SCREW, X2
10		LPSP2004Z	SCREW				
11		PQ41954-1-1	TORSION SPRING	71		LPSP2604Z	ASSY SCREW
12		PQ41955	IMPEDANCE ROLLER	72		PQ42038C	PLATE ASSY
13		PQ41956	COLLAR	72A		PQ31044-1-2	LOCK LEVER
14		PQ41957	LOWER FLANGE	72B		PQM30001-223	TENSION SPRING
	OR	PQ42958	LOWER FLANGE	72C		PQM30001-211	TENSION SPRING
15		PQM30018-39	SPACER	73		PQM30017-28	SLIT WASHER, X2
	OR	PQM30018-50	SPACER	74		PQ42006B	PINCH ROLLER ARM ASSY
16		PQM30002-124	COMPRESSION SPRING	75		PQM30017-28	SLIT WASHER
17		PQ40353	NYLON NUT	76		Q03093-833	WASHER
18		PU60560-2	AUDIO/CONTROL HEAD	77		PQM30001-229	TENSION SPRING
19		PQ42984-2	HEAD BASE	78		PQ42013B-4	GUIDE ARM ASSY
20		PQ43687A	SCREW, X3	78A		PQ42029	SPRING
				79		PQM30017-6	SLIT WASHER
21		PU30080-49	SPRING, X3	80		PQ42019B-6	MAIN BRAKE ASSY (SUPPLY)
22		DPSP2606Z	SCREW, X2				
23		PGZ01143	POLE BASE ASSY(TAKE-UP)	81		PQ42020B	MAIN BRAKE ASSY (TAKE-UP)
24		PU60556-1-2	POLE BASE ASSY(SUPPLY)	82		PQM30001-216	TENSION SPRING
25		PQM30017-5	SLIT WASHER, X2	83		PQ42021A-3	SUB BRAKE ASSY (SUPPLY)
26		PU53629-3	TAPE GUIDE	83A		PQ42023-1-2	TENSION SPRING
27		PQ40268-2	GUIDE FLANGE	84		PQ42037A-2	SUB BRAKE ASSY (TAKE-UP)
28		PRD42612	GUIDE POLE CAP	84A		PQ42028-1-1	TORSION SPRING
29		SPSH2006Z	MINI SCREW	85		PQM30017-6	SLIT WASHER
Δ 30		PGZ01300	CAPSTAN MOTOR	86		PU59925-1-1	LED HOLDER, INCLUDE LED
				87		SPST2606Z	SCREW
31		SPSP2605N	SCREW, X3	88		SPST2606Z	SCREW
32		PRD42685A	HALF LOADING ARM ASSY	89		PU60444	SLIDE ENCODER
33		PQM30017-29	SLIT WASHER	90		SDSP2610Z	SCREW
34		PQ43295A-1	MOTOR BRAKE ASSY				
34A		PQ43296	SPRING	91		PU59919-1-1	CASSETTE SWITCH
35		PQ41974A-3	REEL MOTOR BRACKET ASSY	92		SDST2608Z	SCREW
36		PU58645-1-4	IDLER ARM	93		SDSP2606Z	SCREW, X3
37		Q03093-834	WASHER	94		SDST2606Z	SCREW
38		PQ41976A-1	SPRING ARM ASSY	95		PQ32776	CAP
38A		PQ42212-1-4	SPRING				
39		PQM30017-22	SLIT WASHER				
40		PQ41978	HOLDER				
41		SPST2606Z	SCREW				
Δ 42		PGZ01332	REEL MOTOR				
43		LPSP2604Z	ASSY SCREW, X2				
44		SPST2606Z	SCREW, X2				
45		PU59250-1-2	REEL DISK (SUPPLY)				
46		PQ20248H-20	MAIN DECK ASSY				
		PU58638-1-2	REEL DISK (TAKE-UP)				
47		PQM30017-5	SLIT WASHER, X2				
48		Q03093-828	WASHER, X2				
49		PQ41979A-5	LOADING ARM ASSY (SUPPLY)				
49A		PQ42677	TORSION SPRING (SUPPLY)				
50		PQ41985B-3	LOADING ARM ASSY (TAKE-UP)				
50A		PQ41990	TORSION SPRING (TAKE-UP)				
51		PQ42973A	CAM BRACKET ASSY				
52		PQ42974A	SLIDE CAM PLATE ASSY				
52A		PQM30001-224	SPRING				
53		PQ31677	HALF LOADING CAM				
54		PQ42963	SECOND GEAR				
55		PQM30017-24	SLIT WASHER, X2				
56		PQ41994A-3	ARM GEAR ASSY				
57		PQ20577	CONTROL CAM				
58		PQ41996B	MODE MOTOR ASSY				
	OR	PQ41996C	MODE MOTOR ASSY				
59		PQ41998A	WORM ASSY				
60		LPSP2604Z	ASSY SCREW, X2				

## SECTION 6

### ELECTRICAL PARTS LIST

#### SAFETY PRECAUTION

Parts identified by the  $\triangle$  symbol are critical for safety. Replace only with specified part numbers.

#### ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

**RESISTORS**—All resistance values are in ohms ( $\Omega$ ), unless otherwise indicated.

k	: 1,000 (Kilo)
M	: 1,000,000 (Mega)
Chip R	: Chip Resistor
Chip VR	: Chip Variable Resistor
Comp. R	: Composition Resistor
CR	: Carbon Film Resistor
FR	: Fusible Resistor
MFR	: Metal Film Resistor
MPR	: Metal Plate Resistor
OMR	: Oxide Metal Film Resistor
PMR	: Precision Metal Film Resistor
UFR	: Unflammable Resistor
VR	: Variable Resistor (Potentiometer)
WR	: Wire Wound Resistor

**CAPACITORS**—All capacitance values are in  $\mu\text{F}$ , unless otherwise indicated.

pF	: $\mu\mu\text{F}$ (Pico farad)
C Cap	: Ceramic Capacitor
Chip Cap	: Chip Capacitor
Chip T Cap	: Chip Tantalum Capacitor
E Cap	: Electrolytic Capacitor
FM Cap	: Film Mica Capacitor
LL Cap	: Low Leak Current Electrolytic Capacitor
MM Cap	: Metalized Mylar Capacitor
MP Cap	: Metalized Paper Capacitor
MY Cap	: Mylar Capacitor
NP Cap	: Non-polar Capacitor
PC Cap	: Polycarbonate Capacitor
PP Cap	: Polypropylene Capacitor
PS Cap	: Polystyrol Capacitor
T Cap	: Tantalum Capacitor
TF Cap	: Thin Film Capacitor
TR Cap	: Trimmer Capacitor

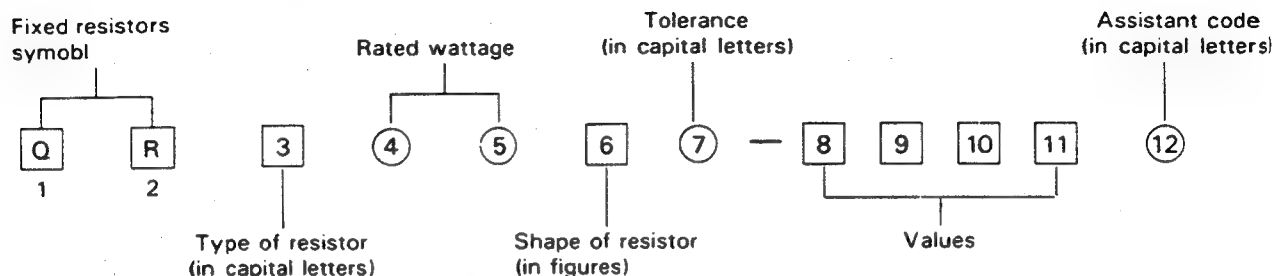
#### NOTES:

- [2 digits] indicates circuit board symbol number.
- "X" indicates quantity per set.
- Regarding electrical parts lists of board assemblies, the lists with asterisk (\*) marks in the following table are common to the three units

## 6.1 STANDARD PART NUMBER CODING

### 6.1.1 Fixed resistor coding

Fixed resistor part numbers are as follows.



#### Type of resistor (third digit)

C	Composition resistors
D	Carbon film resistors
F	Unflammable resistors
G	Oxide metal film resistors
H	Fusible resistors
M	Metal plate resistors
S	Metal glazed resistors
V	Precision metal film resistors
W	Wire wound resistors
X	Metal film resistors
Z	Special resistors

#### Rated wattage (fourth and fifth digits)

A0	1/10 W
18	1/8 W
16	1/6 W
14	1/4 W
12	1/2 W
01	1 W
02	2 W
03	3 W
04	4 W
05	5 W
06	6 W
07	7 W
75	7.5 W
08	8 W
10	10 W
15	15 W
A6	16 W
20	20 W
30	30 W

#### Tolerance (seventh digit)

F	± 1 %
G	± 2 %
J	± 5 %
K	± 10 %
M	± 20 %

#### Assistant code (twelfth digit)

A	Small type
B	Small type
S	Small type
Y	Lead taping
Z	Lead taping

#### Values

(eighth — tenth or eleventh digits)

examples:

R47	.....	0.47 Ω
4R7	.....	4.7 Ω
470	.....	$47 \times 10^0$ ..... 47 Ω
471	.....	$47 \times 10^1$ ..... 470 Ω
472	.....	$47 \times 10^2$ ..... 4.7 kΩ
473	.....	$47 \times 10^3$ ..... 47 kΩ
474	.....	$47 \times 10^4$ ..... 470 kΩ
475	.....	$47 \times 10^5$ ..... 4.7 MΩ

QRV resistance shown by four digits:

4640	.....	$464 \times 10^0$ ..... 464 Ω
4641	.....	$464 \times 10^1$ ..... 4.64 kΩ
4642	.....	$464 \times 10^2$ ..... 46.4 kΩ

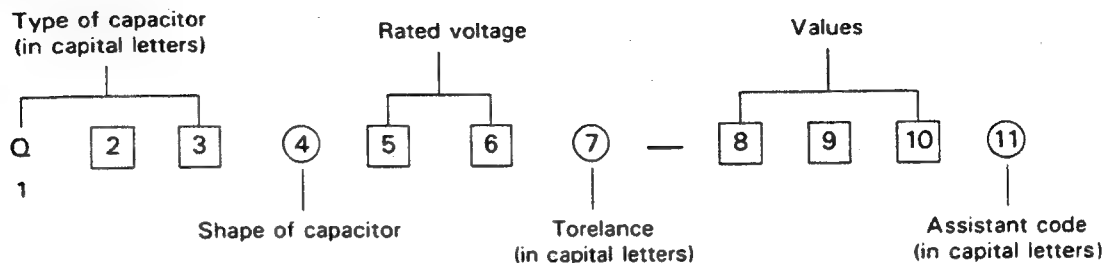
#### Shape of resistor (sixth digit)

Note:  indicates flame retardant resistor.

Shape of resistor	Type of resistor	C	D	F	G	H	M	S	V	W	X
1											
2											
3											
4											
5										(L) type	
6											
7				Lug (B) type							
8				Lug (A) type					Chip		
9				Lug (C) type							

### 6.1.2 Fixed capacitor coding

Fixed capacitor part numbers are as follows.



### Ceramic capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Mono-direction	Kink lead	Axial lead	Axial forming lead	Chip
QCC	Ceramic	1		4	5	
QCD	High capacitance					A
QCF	High capacitance	1,4	3			8,A
QCS	Temperature compensation	1	3	4	5	8,A
QCT	Temperature compensation	Special coding				
QCV	Ceramic			1	3	
QCX	Ceramic			1	3	
QCY	High capacitance	1,4	3	6	7	8,A
QCZ	Special type	Special coding				
QCB	Ceramic			B	C	

### Electrolytic capacitors

Type of capacitor (first-third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Tubular	Mono-direction	Anti-stress	Forming	Snap-in
QEB	Low leakage		4	5	6	
QEC	Low leakage		4,8,A	9,B	6,C	
QEE	Tantalum (normal)		4	5	6	
	Tantalum (small)		8			
QEF	Chip tantalum	8 (chip type)				
QEG	Low impedance		4			
QEK	Miniature type		4	5	6	
QEL	Small type		4	5	6	7
QEM	Small type		4,A	5	6	
QEN	Non-polar	2	4	5	6	
QEP	Non-polar (small)		4,A	5,B	6,C	
QER	Miniature type		4	5	6	
QET	Small type	2	4,A	5,B	6,C	7
QEU	Small type		4	5	6	
QEV	Small type		4		6	7
QEW	Normal	2	4	5	6	7

# Paper film capacitors

Type of capacitor (first – third digits)		Shape of capacitor (fourth digit)				
		Tubular	Normal		Flame retardant	
Symbol	Characteristics		Mono-direction	Kink lead	Mono-direction	Kink lead
QFA	Metalized polypropylene				7	
QFE	Metalized mylar				5	
QFF	Film mica		4			
QFG	Polypropylene film		4	8		
QFH	Metalized mylar	2	4	3	5,7	6
QFJ	Mylar (special)		4			
QFK	Metalized mylar (small)				5	
QFM	Mylar	2	4	3,7	5	6
QFN	Mylar (small)		4	3		
QFP	Polypropylene		4	3,8		
QFS	Polystyrole	2	4	3		
QFV	Thin film		4	8		
QFZ	Special type	Special coding				

## Rated voltage (fifth and sixth digits)

Fifth digit \ Sixth digit													
	A	B	C	D	E	F	G	H	J	K	V	W	X
0						3.15	4.0		6.3				
1	10		16	20	25		40	50	63	80	35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000				5000					

## Tolerance (seventh digit)

A	+100 %	M	±20 %
F	±1 %	N	±30 %
G	±2 %	P	+100 % -0 %
H	+50 % -10 %	R	+30 % -10 %
J	±5 %	X	+40 % -20 %
K	±10 %	Z	+80 % -20 %

## Values (eighth – tenth digits)

Example : Values are in picofarads

101	..... $10 \times 10^1$ pF	100 pF
102	..... $10 \times 10^2$ pF	1,000 pF (0.001 $\mu$ F)
103	..... $10 \times 10^3$ pF	10,000 pF (0.01 $\mu$ F)
104	..... $10 \times 10^4$ pF	100,000 pF (0.1 $\mu$ F)
105	..... $10 \times 10^5$ pF	1 $\mu$ F
5R0	.....	5.0 pF

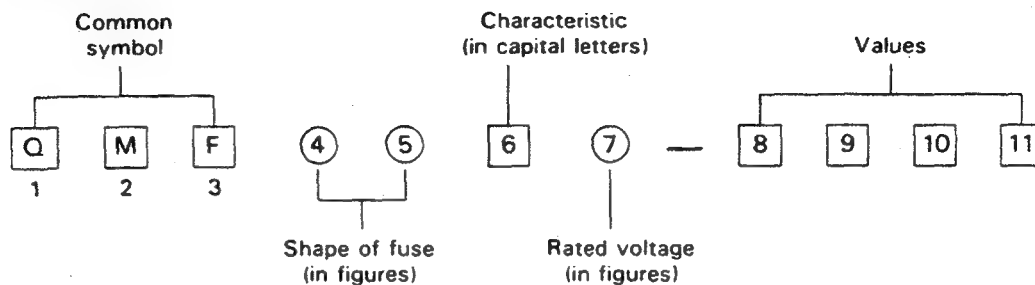
## Assistant code (eleventh digit)

G	Small size
Z	Lead taping
Y	Lead taping



### 6.1.3 Fuse coding

Standard fuse part numbers are as follows.



#### Shape of fuse (fourth and fifth digits)

51	φ5.2 × 20 mm
60	φ6.4 × 30 mm
61	φ6.35 × 31.8 mm
63	φ6.4 × 30 mm with lead wires
66	φ6.35 × 31.8 mm with lead wires
00	Special type

#### Rated voltage (seventh digit)

1	AC125 V
2	AC250 V
3	0.1 – 1 A : AC250 V 1.25 – 6.3 A : AC125 V

#### Values

(eighth-tenth or eleventh digits)  
example:

R63	..... 0.63 A
1R0	..... 1.0 A
2R5	..... 2.5 A
100	..... 10 A
R315	..... 0.315 A
1R25	..... 1.25 A

#### Characteristics (sixth digit)

Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 – 2 sec.	
	400 %	0.01 – 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type (for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type (for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
S	160 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
	700 % – 2000 %	Within 0.01 sec.	
U	135 %	Within 1 hr.	Anti-rush type (for UL)
	200 %	Within 2 min.	
	800 % – 2000 %	Within 0.01 sec.	

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
*****			
	R6	QRG029J-201	OMF RESISTOR
	R7	QRZ0078-R39	WW RESISTOR
	R9	QVZ3507-101	V RESISTOR,SEMI REG 15V ADJ
*****			
	R11	QRD161J-333	RESISTOR
Δ	C1	QFZ9022-683	MM CAPACITOR
Δ	C7	QCZ9016-222M	CAPACITOR
	OR	QCZ9048-222	CAPACITOR
Δ	C8	QCZ9016-222M	CAPACITOR
Δ	OR	QCZ9048-222	CAPACITOR
	C9	QED61HM-226	E CAPACITOR
	C10	QEZ0111-107	E CAPACITOR
*****			
	C11	QCY53AK-472	CAPACITOR
	C12	QCY43AK-121	CAPACITOR
	C13	QFL41HJ-222	M CAPACITOR
	C14	QFV41HJ-474	TF CAPACITOR
	C15	QEZ0108-187Z	E CAPACITOR
Δ	C17	QCZ9016-102K	CAPACITOR
Δ	OR	QCZ9047-102	CAPACITOR
Δ	C18	QCZ9016-102K	CAPACITOR
Δ	OR	QCZ9047-102	CAPACITOR
*****			
	C31	QEZ0125-228	E CAPACITOR
	C32	QEZ0106-338	E CAPACITOR
	C33	QEZ0104-476Z	E CAPACITOR
	C34	QEZ0107-476Z	E CAPACITOR
	C35	QETB1EM-108	E CAPACITOR
	C36	QETB1EM-108	E CAPACITOR
	C37	QETB1AM-108	E CAPACITOR
	C38	QETC1JM-226	E CAPACITOR
	C39	QETC1HM-226	E CAPACITOR
	C40	QFL41HJ-102	M CAPACITOR
*****			
	C41	QFL41HJ-102	M CAPACITOR
*****			
	L11	PU56183-330	COIL
	L12	PU56183-330	COIL
	L13	PU56183-330	COIL
	L14	PU48530-101K	COIL
	L15	PU48530-101K	COIL
	L16	PU48530-8R2K	COIL
	L17	PU48530-8R2K	COIL
Δ	T1	PU60683	SWITCHING TRANSFORMER
Δ	HS1	PQ43231-1-1	HEAT SINK(3)
	HS2	PU60798	HEAT SINK
Δ	LF2	PU60347	LINE FILTER
	SLD1	PQ32558-1-1	SHIELD CASE(1)
	CN1	PU58844-9	CAP HOUSING
	CN2	PU58844-3	CAP HOUSING
*****			
-REGULATOR BOARD ASSY<02>-			
	STK1	PRD42564-14	PWB LABEL
	PWBA2	PGE10144A2	REGULATOR BOARD ASSY
	IC2	BA10324	IC
	IC3	MC7805ACT	IC
	IC101	M54647L	IC
	Q11	2SD1764	TRANSISTOR
	OR	2SD1796	TRANSISTOR
	Q12	2SC1740S	TRANSISTOR
	Q13	2SD1764	TRANSISTOR
	OR	2SD1796	TRANSISTOR
	Q14	2SD1764	TRANSISTOR
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#	REF NO.	PART NO.	PART NAME, DESCRIPTION
	OR	2SD1796	TRANSISTOR
Q15		2SD1764	TRANSISTOR
	OR	2SD1796	TRANSISTOR
Q16		2SB1186(DE)	TRANSISTOR
Q17		2SA720	TRANSISTOR
Q18		DTA114ES	TRANSISTOR
D16		RD6.2ES-T183	ZENER DIODE
D17		RD5.1ES-T182	ZENER DIODE
D19		HZ6B1TE	DIODE
	OR	HZ6B1TJ	DIODE
D20		RD13ES-T183	DIODE
D21		HZS33EB1	ZENER DIODE
D23		1SS133	DIODE
	OR	MA165	DIODE
D24		1SS133	DIODE
	OR	MA165	DIODE
D25		1SS133	DIODE
	OR	MA165	DIODE
D26		1SS133	DIODE
	OR	MA165	DIODE
D27		RD20ES-T182	ZENER DIODE
	OR	MTZ20BT-77	ZENER DIODE
R14		QRD161J-222	RESISTOR
R15		QRD161J-362	RESISTOR
R16		QRD161J-472	RESISTOR
R17		QRD161J-102	RESISTOR
R18		QRD161J-622	RESISTOR
R19		QRD161J-472	RESISTOR
R20		QRD161J-102	RESISTOR
R21		QRD161J-153	RESISTOR
R22		QRD161J-472	RESISTOR
R23		QRD161J-102	RESISTOR
R24		QRD161J-102	RESISTOR
R25		QRD161J-153	RESISTOR
R26		QVZ3521-222	V RESISTOR, SW 5V ADJ
R27		QRD161J-223	RESISTOR
R28		QRD161J-222	RESISTOR
R29		QRD161J-103	RESISTOR
R30		QRD161J-392	RESISTOR
R31		QRD161J-102	RESISTOR
R32		QRD161J-472	RESISTOR
R33		QRD161J-331	RESISTOR
R34		QRD161J-272	RESISTOR
R35		QRZ0077-220X	FUSIBLE RESISTOR
R36		QRZ0077-220X	FUSIBLE RESISTOR
R43		QRD161J-392	RESISTOR
R44		QRD181J-1R0	RESISTOR
R45		QRD181J-1R0	RESISTOR
R46		QRD181J-1R0	RESISTOR
R47		QRD181J-1R0	RESISTOR
R48		QRD181J-1R0	RESISTOR
R49		QRD181J-1R0	RESISTOR
R50		QRD181J-1R0	RESISTOR
R51		QRD181J-1R0	RESISTOR
R52		QRD181J-562	RESISTOR
R53		QRD181J-562	RESISTOR
C43		QFN31HJ-103	M CAPACITOR
C44		QETC1CM-107	E CAPACITOR
C45		QETC1HM-106	E CAPACITOR
C46		QFN31HJ-103	M CAPACITOR
C47		QFN31HJ-103	M CAPACITOR
C48		QETC1CM-107	E CAPACITOR
C49		QFN31HJ-103	M CAPACITOR
C50		QFN31HJ-103	M CAPACITOR
C51		QETC1AM-107	E CAPACITOR

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
C52		QETC1HM-476	E CAPACITOR
C53		QETC1CM-107	E CAPACITOR
C54		QETC1HM-106	E CAPACITOR
C55		QFN31HJ-103	M CAPACITOR
C56		QFN31HJ-103	M CAPACITOR
C57		QETC1AM-107	E CAPACITOR
C58		QETC1HM-226	E CAPACITOR
C59		QETC1HM-226	E CAPACITOR
C60		QETC1HM-226	E CAPACITOR
C101		QETC1EM-476	E CAPACITOR
C102		QETC1HM-105	E CAPACITOR
L18		PU53618-101J	COIL
HD1		PU57505	FUSE CLIP, X2
HS1		PQ43701-1-1	HEAT SINK
LF1		PU60020	LINE FILTER
TAB1		A74316	TAB, X2
TP1		PU55774	TEST PIN, X4
CN4		PU58844-102	CAP HOUSING
CN5		PU58844-102R	CAP HOUSING
CN6		PU58844-107	CAP HOUSING
CN7		PU58844-105	CAP HOUSING
CN8		PU58844-108	CAP HOUSING
CN9		PU58844-103R	CAP HOUSING
CN10		PU58844-103R	CAP HOUSING
CN11		PU58844-103	CAP HOUSING
CN12		PU58844-108	CAP HOUSING
CN13		PU58844-103Y	CAP HOUSING
CP1		ICP-F25	CIRCUIT PROTECTOR
CP2		ICP-F25	CIRCUIT PROTECTOR
CP3		ICP-F20	CIRCUIT PROTECTOR
CP4		ICP-F20	CIRCUIT PROTECTOR
CP101		ICP-F25	CIRCUIT PROTECTOR
*****			
*****			
* 6. MAIN BOARD ASSY <04> *			
*****			
PWBA		PRK10032A-01	MAIN BOARD ASSY
B112		QRD161J-0R0	RESISTOR
HN1		PU58018-1-2	PWB HINGE, X2
SPC1		PU60010	SPACER, X4
CN1		PU58844-3	CAP HOUSING
CN2		PU58844-2	CAP HOUSING
CN3		PU58844-4R	CAP HOUSING
CN4		PU58844-5	CAP HOUSING
CN5		PU58844-5	CAP HOUSING
CN6		PU58844-4	CAP HOUSING
CN7		PU58844-5	CAP HOUSING
CN8		PU58844-2Y	CAP HOUSING
CN9		PU58844-2	CAP HOUSING
CN10		PU58844-2	CAP HOUSING
CN11		PU58844-5Y	CAP HOUSING
CN12		PU58844-8	CAP HOUSING
CN13		PU58844-4	CAP HOUSING

# REF NO. PART NO. PART NAME, DESCRIPTION

CN14 PU58844-4R CAP HOUSING  
CN15 PU58844-4 CAP HOUSING  
CN16 PU58844-3 CAP HOUSING  
CN17 PU58844-6 CAP HOUSING

-VIDEO Y SECTION-

IC1 PB20291A Y MODULE BOARD ASSY  
IC3 M51288SP IC  
IC6 PB20290A-02 JOG MOD.(JA059)  
IC7 M52055P IC  
IC10 PB20298A Y MODULE BOARD ASSY

IC11 PB20286A-02 YNR MODULE BOARD ASSY  
IC12 VC2063S IC  
IC13 TC74HC04AP IC  
OR MC74HC04AN IC  
IC14 AN6041 IC  
IC15 BA7021 IC  
IC16 BU4066B IC  
IC18 NJM2233BD IC  
IC19 NJM2233BD IC  
IC20 7VT05 IC

Q2 DTC124ES TRANSISTOR  
Q4 2SC1740S(QRS) TRANSISTOR  
Q5 2SC1740S(QRS) TRANSISTOR  
Q7 DTC124ES TRANSISTOR  
Q9 2SA933S TRANSISTOR

Q12 2SC1740S(QRS) TRANSISTOR  
Q13 2SC1740S(QRS) TRANSISTOR  
Q14 2SA933S TRANSISTOR  
Q15 2SA933S TRANSISTOR  
Q16 2SA933S TRANSISTOR  
Q17 DTC124ES TRANSISTOR  
Q18 2SK381(C) FE TRANSISTOR  
Q19 2SA933S TRANSISTOR  
Q20 2SC1740S(QRS) TRANSISTOR

Q21 2SC1740S(QRS) TRANSISTOR  
Q22 DTC144ES TRANSISTOR  
Q23 2SA933S TRANSISTOR  
Q24 2SA933S TRANSISTOR  
Q25 2SA933S TRANSISTOR  
Q26 2SC1740S(QRS) TRANSISTOR  
Q27 DTC124ES TRANSISTOR  
Q29 DTA124ES TRANSISTOR  
Q30 2SC1740S(QRS) TRANSISTOR

Q33 2SA933S TRANSISTOR  
Q34 2SC1740S(RS) TRANSISTOR  
Q35 2SB851Q,R TRANSISTOR  
Q36 DTA124ES TRANSISTOR  
Q37 DTA124ES TRANSISTOR  
Q38 DTC124ES TRANSISTOR  
Q39 2SC3313CTA TRANSISTOR  
Q40 2SC3313CTA TRANSISTOR

Q41 2SC1740S(QRS) TRANSISTOR  
Q42 2SC2647C TRANSISTOR  
Q43 2SC2647C TRANSISTOR  
Q45 2SC1740S(QRS) TRANSISTOR  
Q46 2SA933S TRANSISTOR  
Q47 2SC1740S(QRS) TRANSISTOR  
Q48 2SC1740S(QRS) TRANSISTOR  
Q49 2SA933S TRANSISTOR  
Q50 2SA933S TRANSISTOR

Q51 2SA933S TRANSISTOR  
Q52 2SC1740S(QRS) TRANSISTOR  
Q53 DTC124ES TRANSISTOR  
Q54 DTC144ES TRANSISTOR  
Q55 2SA933S TRANSISTOR

# REF NO. PART NO. PART NAME, DESCRIPTION

Q56 DTA124ES TRANSISTOR  
Q57 2SC1740S(QRS) TRANSISTOR

D1 1SS133 DIODE  
OR MA165 DIODE  
D2 1SS133 DIODE  
OR MA165 DIODE  
D3 1SS133 DIODE  
OR MA165 DIODE  
D4 1SS133 DIODE  
OR MA165 DIODE  
D5 1SS133 DIODE  
OR MA165 DIODE  
D6 1SS133 DIODE  
OR MA165 DIODE  
D7 1SS133 DIODE  
OR MA165 DIODE  
D8 1SS133 DIODE  
OR MA165 DIODE  
D10 1SS133 DIODE  
OR MA165 DIODE

D11 1SS133 DIODE  
OR MA165 DIODE  
D12 1SS133 DIODE  
OR MA165 DIODE  
D13 1SS133 DIODE  
OR MA165 DIODE  
D20 OA90UF DIODE

D21 OA90UF DIODE  
D22 1SS133 DIODE  
OR MA165 DIODE  
D23 1SS133 DIODE  
OR MA165 DIODE  
D24 1SS133 DIODE  
OR MA165 DIODE  
D26 1SS133 DIODE  
OR MA165 DIODE  
D27 1SS133 DIODE  
OR MA165 DIODE  
D29 1SS133 DIODE  
OR MA165 DIODE

D31 1SS133 DIODE  
OR MA165 DIODE  
D32 1SS133 DIODE  
OR MA165 DIODE  
D34 RD9.1ES-T182 ZENER DIODE  
D35 1SS133 DIODE  
OR MA165 DIODE

R1 QRD161J-562 RESISTOR  
R2 QRD161J-822 RESISTOR  
R4 QRD161J-182 RESISTOR  
R6 QRD161J-681 RESISTOR  
R7 QRD161J-223 RESISTOR  
R8 QRD161J-273 RESISTOR  
R9 QRD161J-223 RESISTOR  
R10 QRD161J-681 RESISTOR

R11 QRD161J-331 RESISTOR  
R12 QRD161J-331 RESISTOR  
R13 QRD161J-475 RESISTOR  
R14 QRD161J-102 RESISTOR  
R17 QRD161J-821 RESISTOR  
R18 QRD161J-102 RESISTOR  
R19 QRD161J-222 RESISTOR

R25 QRD161J-562 RESISTOR  
R26 QRD121J-181 RESISTOR  
R27 QVZ3518-102 V.R.0.25H DL VIDEO LEVEL  
R28 QRD161J-471 RESISTOR  
R29 QRD161J-821 RESISTOR

#A	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R30	QRD161J-561	RESISTOR
	R31	QRD161J-471	RESISTOR
	R32	QRD161J-153	RESISTOR
	R33	QRD161J-561	RESISTOR
	R34	QRD161J-182	RESISTOR
	R35	QRD161J-102	RESISTOR
	R36	QRD161J-221	RESISTOR
	R37	QRD161J-271	RESISTOR
	R38	QRD161J-471	RESISTOR
	R39	QRD161J-152	RESISTOR
	R40	QRD161J-152	RESISTOR
	R41	QRD161J-562	RESISTOR
	R42	QVZ3518-103	V.R.SHARPNES PRESET
	R43	QRD161J-103	RESISTOR
	R45	QRD161J-331	RESISTOR
	R47	QRD161J-182	RESISTOR
	R48	QRD161J-391	RESISTOR
	R49	QRD161J-152	RESISTOR
	R50	QRD161J-102	RESISTOR
	R51	QRD161J-153	RESISTOR
	R52	QRD161J-683	RESISTOR
	R53	QRD161J-122	RESISTOR
	R55	QRD161J-102	RESISTOR
	R57	QRD167J-102	RESISTOR
	R58	QRD161J-0R0	RESISTOR
	R60	QRD161J-273	RESISTOR
	R61	QRD161J-223	RESISTOR
	R62	QRD161J-222	RESISTOR
	R63	QRD161J-102	RESISTOR
	R64	QRD161J-102	RESISTOR
	R65	QRD161J-152	RESISTOR
	R66	QRD161J-561	RESISTOR
	R67	QRD161J-821	RESISTOR
	R68	QRD161J-471	RESISTOR
	R69	QRD161J-123	RESISTOR
	R70	QRD161J-473	RESISTOR
	R71	QRD161J-122	RESISTOR
	R72	QRD161J-102	RESISTOR
	R73	QRD161J-822	RESISTOR
	R74	QRD161J-182	RESISTOR
	R75	QVZ3518-102	V RESISTOR,EE Y LEVEL
	R76	QRD161J-272	RESISTOR
	R77	QRD161J-332	RESISTOR
	R78	QRD161J-183	RESISTOR
	R79	QRD161J-222	RESISTOR
	R80	QRD161J-681	RESISTOR
	R81	QRD161J-223	RESISTOR
	R82	QRD161J-393	RESISTOR
	R83	QRD161J-153	RESISTOR
	R84	QRD161J-154	RESISTOR
	R85	QRD161J-124	RESISTOR
	R87	QRD161J-394	RESISTOR
	R88	QRD161J-475	RESISTOR
	R89	QRD161J-562	RESISTOR
	R91	QVZ3518-473	V RESISTOR,PB Y LEVEL
	R93	QRD161J-223	RESISTOR
	R94	QRD161J-182	RESISTOR
	R95	QVZ3518-222	V RESISTOR,C.REC FM LEVEL
	R96	QRD161J-122	RESISTOR
	R97	QRD161J-103	RESISTOR
	R98	QRD161J-223	RESISTOR
	R99	QRD161J-681	RESISTOR
	R105	QRD161J-331	RESISTOR
	R106	QRD161J-102	RESISTOR
	R107	QVZ3518-151	V RESISTOR,Y COMB LEVEL
	R108	QVZ3518-473	V RESISTOR,4H DL CHROMA

#A	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R109	QRD161J-223	RESISTOR
	R110	QVZ3518-473	V RESISTOR,2H DL CHROMA
	R111	QRD161J-223	RESISTOR
	R112	QRD161J-391	RESISTOR
	R113	QRD161J-391	RESISTOR
	R114	QRD161J-391	RESISTOR
	R115	QRD161J-391	RESISTOR
	R116	QRD161J-391	RESISTOR
	R117	QRD161J-223	RESISTOR
	R118	QVZ3520-223	V RESISTOR,Y COMB GAIN
	R119	QVZ3520-472	V RESISTOR,Y COMB PHASE
	R120	QRD161J-102	RESISTOR
	R122	QRD161J-102	RESISTOR
	R123	QRD161J-102	RESISTOR
	R124	QRD161J-102	RESISTOR
	R125	QRD161J-102	RESISTOR
	R126	QRD161J-102	RESISTOR
	R127	QRD161J-473	RESISTOR
	R128	QRD161J-562	RESISTOR
	R129	QRD161J-103	RESISTOR
	R130	QRD161J-393	RESISTOR
	R131	QRD161J-272	RESISTOR
	R133	QRD161J-224	RESISTOR
	R135	QRD161J-473	RESISTOR
	R136	QRD161J-393	RESISTOR
	R137	QRD161J-153	RESISTOR
	R138	QRD161J-561	RESISTOR
	R139	QRD161J-182	RESISTOR
	R140	QRD161J-271	RESISTOR
	R141	QRD161J-223	RESISTOR
	R142	QRD161J-392	RESISTOR
	R145	QRD161J-562	RESISTOR
	R146	QRD161J-682	RESISTOR
	△ R147	QRD121J-680	RESISTOR
	R148	QRD161J-271	RESISTOR
	R149	QRD161J-101	RESISTOR
	R150	QRD161J-101	RESISTOR
	R151	QRD161J-393	RESISTOR
	R152	QRD161J-822	RESISTOR
	R153	QRD161J-122	RESISTOR
	R154	QRD161J-271	RESISTOR
	R155	QRD161J-222	RESISTOR
	R156	QRD161J-221	RESISTOR
	R157	QRD161J-221	RESISTOR
	R161	QRD161J-222	RESISTOR
	R163	QVZ3518-681	V.R.0.25H DL VIDEO LEVEL
	R164	QRD161J-102	RESISTOR
	R165	QRD161J-102	RESISTOR
	R166	QRD161J-151	RESISTOR
	R167	QRD161J-102	RESISTOR
	R168	QRD161J-102	RESISTOR
	R169	QRD161J-223	RESISTOR
	R170	QRD161J-153	RESISTOR
	R173	QRD161J-472	RESISTOR
	R175	QRD161J-331	RESISTOR
	R176	QRD161J-392	RESISTOR
	R177	ERT-02FHL332S	THERMISTOR
	R178	QRD161J-272	RESISTOR
	R179	QRD161J-223	RESISTOR
	R180	QRD161J-122	RESISTOR
	R181	QRD161J-562	RESISTOR
	R184	QRD161J-272	RESISTOR
	R185	QRD161J-471	RESISTOR
	R186	QRD161J-391	RESISTOR
	R187	QRD161J-621	RESISTOR
	R188	QRD161J-392	RESISTOR

#A	REF NO.	PART NO.	PART NAME, DESCRIPTION	#A	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R189	QRD161J-181	RESISTOR		C49	QETC1CM-106	E CAPACITOR
	R190	QRD161J-821	RESISTOR		C50	QCVB1CN-103	CAPACITOR
	R191	QRD161J-222	RESISTOR		C51	QCSB1HJ-390	CAPACITOR
	R192	ERT-02FGL102S	THERMISTOR		C52	QCVB1CN-103	CAPACITOR
	R193	QRD161J-473	RESISTOR		C53	QETC1CM-476	E CAPACITOR
	R194	QRD161J-473	RESISTOR		C54	QETC1CM-106	E CAPACITOR
	R195	QRD161J-561	RESISTOR		C55	QEK61CM-106	E CAPACITOR
	R196	QRD161J-561	RESISTOR		C56	QEK61CM-106	E CAPACITOR
	R197	QVZ3520-471	V RESISTOR,Y COMB ADJ		C57	QEK61CM-106	E CAPACITOR
	R198	QRD161J-103	RESISTOR		C58	QEK61CM-106	E CAPACITOR
	R199	QRD161J-121	RESISTOR		C60	QEK61CM-476	E CAPACITOR
	R200	QRD161J-102	RESISTOR		C61	QCVB1CN-103	CAPACITOR
	R201	QRD161J-332	RESISTOR		C62	QCSB1HJ-470	CAPACITOR
	R204	QRD161J-102	RESISTOR		C63	QCVB1CN-103	CAPACITOR
	R205	QRD161J-102	RESISTOR		C64	QCS31HJ-220	CAPACITOR
A	R206	QRD121J-680	RESISTOR		C65	QEK60JM-476	E CAPACITOR
	R209	QRD161J-474	RESISTOR		C66	QEK61CM-106	E CAPACITOR
	R210	QRD161J-101	RESISTOR		C67	QCVB1CN-103	CAPACITOR
	R211	QRD161J-101	RESISTOR		C68	QEK61CM-106	E CAPACITOR
	R212	QRD161J-122	RESISTOR		C74	QCSB1HJ-560	CAPACITOR
	R213	QRD161J-182	RESISTOR		C76	QETC0JM-476	E CAPACITOR
	R214	QVZ3518-222	V.R,B/W REC FM LEVEL		C84	QCSB1HJ-121	CAPACITOR
	R217	QRD161J-473	RESISTOR		C85	QCSB1HJ-560	CAPACITOR
	R218	QRD161J-103	RESISTOR		C86	QEK61CM-106	E CAPACITOR
	R219	QRD161J-821	RESISTOR		C87	QCSB1HJ-150	CAPACITOR
	R223	QRD161J-103	RESISTOR		C88	QEK61HM-225	E CAPACITOR
	R224	QRD161J-102	RESISTOR		C89	QEK61CM-106	E CAPACITOR
	R226	QRD161J-181	RESISTOR		C90	QEK51CM-476	E CAPACITOR
	R227	QRD161J-561	RESISTOR		C91	QCVB1CN-103	CAPACITOR
	R229	QRD161J-080	RESISTOR		C92	QETC1CM-106	E CAPACITOR
	R230	QRD161J-102	RESISTOR		C93	QCSB1HJ-101	CAPACITOR
	R231	QRD161J-750	RESISTOR		C94	QCSB1HJ-270	CAPACITOR
	C1	QCSB1HJ-560	CAPACITOR		C95	QCSB1HJ-180	CAPACITOR
	C2	QCSB1HJ-101	CAPACITOR		C96	QETC1HM-335	E CAPACITOR
	C3	QCSB1HJ-181	CAPACITOR		C97	QCSB1HJ-151	CAPACITOR
	C4	QETC1EM-475	E CAPACITOR		C98	QETC1HM-105	E CAPACITOR
	C5	QETC1HM-224	E CAPACITOR		C99	QED60JM-127	E CAPACITOR
	C6	QETC0JM-337	E CAPACITOR		C100	QCVB1CN-103	CAPACITOR
	C7	QCVB1CN-103	CAPACITOR		C101	QETA0JM-337	E CAPACITOR
	C8	QCSB1HJ-560	CAPACITOR		C102	QCSB1HJ-120	CAPACITOR
	C9	QENC1HM-105	NP E CAPACITOR		C103	QCSB1HJ-560	CAPACITOR
	C10	QCVB1CN-103	CAPACITOR		C104	QCSB1HJ-560	CAPACITOR
	C11	QCSB1HJ-680	CAPACITOR		C105	QCVB1CN-103	CAPACITOR
	C13	QCVB1CN-103	CAPACITOR		C108	QCVB1CN-103	CAPACITOR
	C14	QETC1HM-225	E CAPACITOR		C109	QCSB1HJ-101	CAPACITOR
	C16	QCSB1HJ-181	CAPACITOR		C110	QCVB1CN-103	CAPACITOR
	C17	QCSB1HJ-391	CAPACITOR		C111	QETC0JM-476	E CAPACITOR
	C18	QETC1HM-225	E CAPACITOR		C112	QCVB1CN-103	CAPACITOR
	C19	QETC1CM-106	E CAPACITOR		C113	QCSB1HJ-101	CAPACITOR
	C25	QCVB1CN-103	CAPACITOR		C114	QCVB1CN-103	CAPACITOR
	C26	QCVB1CN-103	CAPACITOR		C115	QCVB1CN-103	CAPACITOR
	C27	QCVB1CN-103	CAPACITOR		C116	QCSB1HJ-101	CAPACITOR
	C29	QETC1EM-475	E CAPACITOR		C117	QCVB1CN-103	CAPACITOR
	C30	QCVB1CN-103	CAPACITOR		C118	QCVB1CN-103	CAPACITOR
	C31	QEK61EM-475	E CAPACITOR		C119	QCVB1CN-103	CAPACITOR
	C32	QEK61EM-475	E CAPACITOR		C120	QCVB1CN-103	CAPACITOR
	C33	QER61AM-226	E CAPACITOR		C121	QEK61CM-106	E CAPACITOR
	C34	QETC0JM-337	E CAPACITOR		C122	QCVB1CN-103	CAPACITOR
	C35	QCVB1CN-103	CAPACITOR		C123	QETC1HM-105	E CAPACITOR
	C36	QEP61EM-475	NP E CAPACITOR		C124	QCVB1CN-103	CAPACITOR
	C37	QER61EM-475	E CAPACITOR		C125	QETC1CM-476	E CAPACITOR
	C38	QCVB1CN-103	CAPACITOR		C126	QEK61AM-476	E CAPACITOR
	C43	QEK61CM-106	E CAPACITOR		C127	QCVB1CN-103	CAPACITOR
	C44	QCVB1CN-103	CAPACITOR		C130	QETC0JM-476	E CAPACITOR
					C131	QCVB1CN-103	CAPACITOR



#	REF NO.	PART NO.	PART NAME, DESCRIPTION	#	REF NO.	PART NO.	PART NAME, DESCRIPTION
C132		QETC1AM-476	E CAPACITOR	L11		PU48530-101K	COIL
C133		QCVB1CN-103	CAPACITOR	L12		PU48530-101K	COIL
C134		QCVB1CN-103	CAPACITOR	L13		PU59152-220J	COIL
C135		QETC1CM-476	E CAPACITOR	L14		PU48530-101K	COIL
C136		QCVB1CN-103	CAPACITOR	L15		PU48530-101K	COIL
C137		QETC1CM-476	E CAPACITOR	L16		PU59152-820J	COIL
C138		QCVB1CN-103	CAPACITOR	L19		PU48530-101K	COIL
C139		QCVB1CN-103	CAPACITOR	L20		PU48530-471K	COIL
C140		QETCOJM-476	E CAPACITOR	L21		PU59152-150J	COIL
C141		QCVB1CN-103	CAPACITOR	L22		PU48530-101K	COIL
C142		QEN61HM-105	NP E CAPACITOR	L23		PU48530-471K	COIL
C143		QETC1HM-104	E CAPACITOR	L24		PU48530-560J	COIL
C144		QCVB1CN-103	CAPACITOR	L25		PU48530-471J	COIL
C146		QCSB1HJ-220	CAPACITOR	L26		PU59152-121J	COIL
C147		QCSB1HJ-101	CAPACITOR	L27		PU48530-101K	COIL
C148		QCVB1CN-103	CAPACITOR	L28		PU48530-101K	COIL
C149		QCSB1HJ-560	CAPACITOR	L29		PU48530-101K	COIL
C150		QCSB1HJ-390	CAPACITOR	L30		PU60165-8R2G	COIL
C151		QCVB1CN-103	CAPACITOR	L31		PU60165-8R2G	COIL
C152		QEK61CM-336	E CAPACITOR	L32		PU48530-101K	COIL
C153		QCSB1HK-5R6	CAPACITOR	L33		PU59152-180J	COIL
C154		QCSB1HJ-390	CAPACITOR	L35		PU59152-1R0K	COIL
C155		QCSB1HJ-120	CAPACITOR	L36		PU59152-1R0K	COIL
C156		QCSB1HJ-100	CAPACITOR	L38		PU59152-5R6J	COIL
C159		QCVB1CN-103	CAPACITOR	L39		PU48530-101K	COIL
C160		QCSB1HJ-151	CAPACITOR	L40		PU59152-820J	COIL
C165		QEK61CM-476	E CAPACITOR	L41		PU59152-101J	COIL
C166		QCVB1CN-103	CAPACITOR	L43		PU48530-101K	COIL
C167		QETC1CM-107	E CAPACITOR	L44		PU59152-151J	COIL
C168		QCVB1CN-103	CAPACITOR	L46		PU48530-101K	COIL
C169		QETC1CM-106	E CAPACITOR	L47		PU48530-470J	COIL
C171		QCVB1CN-103	CAPACITOR	EQ1		PU60099	EQUALIZER
C172		QCVB1CN-103	CAPACITOR	EQ2		PU60809	EQUALIZER
C173		QCT25CH-470	CAPACITOR	EQ3		PU60810	EQUALIZER
C174		QCSB1HJ-471	CAPACITOR	LPF2		PGZ00183	LOW PASS FILTER
C175		QCC31CJ-563	CAPACITOR	LPF3		PU60806-2	LOW PASS FILTER
C178		QCVB1CN-103	CAPACITOR	BPF2		PU60921	BAND PASS FILTER
C179		QCSB1HJ-470	CAPACITOR	BPF3		PU60808-2	BAND PASS FILTER
C180		QCSB1HJ-220	CAPACITOR	DL1		PU60815	2H DELAY LINE
C183		QCSB1HJ-390	CAPACITOR	DL3		PU61081	1/4H DELAY LINE
C184		QCVB1CN-103	CAPACITOR	X101		PU60438	CRYSTAL RESONATOR
C185		QCSB1HK-3R9	CAPACITOR	T1		PU60814	COIL, 4H DLY'D CHROMA
C190		QCVB1CN-103	CAPACITOR	T2		PU60814	COIL, 2H DLY'D CHROMA
C191		QEK61CM-476	E CAPACITOR	-VIDEO C SECTION-			
C192		QETC1CM-106	E CAPACITOR	IC301		PB20287A-03	C.MOD(JA056-01)
C193		QETC1CM-106	E CAPACITOR	IC302		PB20289A-02	JOG MOD.(JA058)
C194		QETC1CM-106	E CAPACITOR	IC303		NJM2233AD	IC
C196		QER41CM-476	E CAPACITOR	Q301		2SA933S	TRANSISTOR
C197		PU54990-3	E CAPACITOR	Q302		DTC144WS	TRANSISTOR
C198		PU54990-3	E CAPACITOR	Q303		DTA124ES	TRANSISTOR
C199		QCVB1CN-103	CAPACITOR	Q304		2SC1740S(QRS)	TRANSISTOR
C200		QCVB1CN-103	CAPACITOR	Q305		2SC1740S(QRS)	TRANSISTOR
C201		QCVB1CN-103	CAPACITOR	Q307		2SC2021Q,R,S	TRANSISTOR
C203		QER61EM-335	E CAPACITOR	Q308		2SA937	TRANSISTOR
C204		QCZ0208-104	MC CAPACITOR	Q309		2SC1740S(QRS)	TRANSISTOR
C206		QCS11HJ-150	CAPACITOR	Q310		DTC124ES	TRANSISTOR
C207		QCZ0208-104	MC CAPACITOR	Q311		2SC1740S(QRS)	TRANSISTOR
L1		PU59152-220J	COIL	Q312		DTC114ES	TRANSISTOR
L2		PU48530-101K	COIL	Q313		DTC114ES	TRANSISTOR
L4		PU48530-101K	COIL	Q314		DTC144WS	TRANSISTOR
L6		PU48530-101K	COIL	Q315		2SC1740S(QRS)	TRANSISTOR
L7		PU48530-101K	COIL				
L8		PU48530-101K	COIL				
L9		PU48530-101K	COIL				
L10		PU48530-101K	COIL				

#△ REF NO.	PART NO.	PART NAME, DESCRIPTION
Q316	2SA933S	TRANSISTOR
Q317	2SC1740S(QRS)	TRANSISTOR
Q318	2SC1740S(QRS)	TRANSISTOR
Q319	2SC1740S(QRS)	TRANSISTOR
Q323	DTC124ES	TRANSISTOR
Q324	DTC124ES	TRANSISTOR
Q326	2SA933S	TRANSISTOR
Q327	2SA933S(QRS)	TRANSISTOR
Q331	DTC124ES	TRANSISTOR
D301	1SS133	DIODE
OR	MA165	DIODE
D302	1SS133	DIODE
OR	MA165	DIODE
D311	1SS133	DIODE
OR	MA165	DIODE
D312	1SS133	DIODE
OR	MA165	DIODE
D313	1SS133	DIODE
OR	MA165	DIODE
D314	1SS133	DIODE
OR	MA165	DIODE
D315	1SS133	DIODE
OR	MA165	DIODE
D323	1SS133	DIODE
OR	MA165	DIODE
D324	1SS133	DIODE
OR	MA165	DIODE
D325	1SS133	DIODE
OR	MA165	DIODE
D326	1SS133	DIODE
OR	MA165	DIODE
D327	1SS133	DIODE
OR	MA165	DIODE
R302	QRD161J-102	RESISTOR
R303	QRD161J-102	RESISTOR
R304	QRD161J-102	RESISTOR
R305	QRD161J-102	RESISTOR
R307	QRD161J-225	RESISTOR
R308	QRD161J-103	RESISTOR
R309	QRD161J-102	RESISTOR
R310	QRD161J-222	RESISTOR
R311	QRD161J-222	RESISTOR
R312	QRD161J-561	RESISTOR
R313	QRD161J-561	RESISTOR
R314	QRD161J-103	RESISTOR
R315	QRD161J-471	RESISTOR
R316	QRD161J-223	RESISTOR
R319	QRD161J-102	RESISTOR
R320	QRD161J-102	RESISTOR
R321	QRD161J-561	RESISTOR
R322	QRD161J-471	RESISTOR
R323	QRD161J-272	RESISTOR
R324	QRD161J-391	RESISTOR
R325	QRD161J-223	RESISTOR
R326	QRD161J-561	RESISTOR
R327	QRD161J-333	RESISTOR
R328	QRD161J-102	RESISTOR
R329	QRD161J-222	RESISTOR
R330	QRD161J-561	RESISTOR
R331	QRD161J-561	RESISTOR
R332	QRD161J-393	RESISTOR
R333	QRD161J-223	RESISTOR
R334	QRD161J-221	RESISTOR
R335	QRD161J-391	RESISTOR
R336	QRD161J-681	RESISTOR

#△ REF NO.	PART NO.	PART NAME, DESCRIPTION
R337	QRD161J-333	RESISTOR
R338	QRD161J-333	RESISTOR
R339	QRD161J-151	RESISTOR
R340	QRD161J-272	RESISTOR
R341	QRD161J-391	RESISTOR
R342	QRD161J-561	RESISTOR
R343	QRD161J-393	RESISTOR
R344	QRD161J-332	RESISTOR
R345	QRD161J-472	RESISTOR
R346	QRD161J-103	RESISTOR
R347	QRD161J-473	RESISTOR
R349	QRD161J-122	RESISTOR
R350	QRD161J-471	RESISTOR
R351	QRD161J-102	RESISTOR
R352	QRD161J-102	RESISTOR
R353	QVZ3518-222	V.R,PAL LP REC COLOR
R355	QVZ3518-222	V.R,PAL SP REC COLOR
R357	QRD161J-333	RESISTOR
R358	QRD161J-223	RESISTOR
R359	QRD161J-223	RESISTOR
R360	QRD161J-102	RESISTOR
R361	QRD161J-332	RESISTOR
R362	QRD161J-103	RESISTOR
R363	QRD161J-103	RESISTOR
R364	QRD161J-223	RESISTOR
R366	QRD161J-103	RESISTOR
R367	QRD161J-473	RESISTOR
R368	QRD161J-332	RESISTOR
R371	QRD161J-102	RESISTOR
R372	QRD161J-102	RESISTOR
C301	QETC1HM-105	E CAPACITOR
C302	QETC1HM-105	E CAPACITOR
C303	QCC31CJ-223	CAPACITOR
C304	QETC0JM-107	E CAPACITOR
C305	QETC1HM-105	E CAPACITOR
C307	QCSB1HJ-330	CAPACITOR
C308	QCSB1HJ-390	CAPACITOR
C309	QFN41HJ-473	M CAPACITOR
C310	QCSB1HJ-560	CAPACITOR
C311	QEK60JM-476	E CAPACITOR
C312	QCVB1CN-103	CAPACITOR
C314	QCB81HJ-820	CAPACITOR
C315	QCC31CK-682	CAPACITOR
C316	QCVB1CN-103	CAPACITOR
C317	QCB81HJ-820	CAPACITOR
C318	QCB81HJ-820	CAPACITOR
C320	QCVB1CN-103	CAPACITOR
C321	QETC1HM-105	E CAPACITOR
C322	QETC1HM-104	E CAPACITOR
C323	QEK61EM-475	E CAPACITOR
C324	QCC31CK-104	CAPACITOR
C325	QETC0JM-337	E CAPACITOR
C326	QCC31CK-563	CAPACITOR
C327	QETC0JM-107	E CAPACITOR
C328	QETC1EM-335	E CAPACITOR
C329	QETC0JM-337	E CAPACITOR
C330	QETB1HM-474	E CAPACITOR
C331	QETC1HM-474	E CAPACITOR
C332	QETC1HM-474	E CAPACITOR
C333	QEK61HM-474	E CAPACITOR
C334	QETC1HM-474	E CAPACITOR
C335	QETC1CM-106	E CAPACITOR
C336	QCVB1CN-103	CAPACITOR
C337	QCB81HJ-121	CAPACITOR
C338	QCVB1CN-103	CAPACITOR
C339	QCVB1CN-103	CAPACITOR

#△ REF NO. PART NO. PART NAME, DESCRIPTION

C341 QCVB1CN-103 CAPACITOR  
C342 QCSB1HJ-100 CAPACITOR  
C343 QCVB1CN-103 CAPACITOR  
C345 QCVB1CN-103 CAPACITOR  
C346 QCVB1CN-103 CAPACITOR  
C347 QCSB1HJ-390 CAPACITOR  
C348 QCVB1CN-103 CAPACITOR  
C349 QCVB1CN-103 CAPACITOR  
C350 QCVB1CN-103 CAPACITOR

C351 QCVB1CN-103 CAPACITOR  
C352 QEK60JM-476 E CAPACITOR  
C353 QCVB1CN-103 CAPACITOR  
C355 QCVB1CN-103 CAPACITOR  
C356 QER61HM-105 E CAPACITOR  
C357 QER61EM-475 E CAPACITOR

L301 PU48530-101K COIL  
L303 PU48530-101K COIL  
L304 PU59152-390J COIL  
L305 PU48530-222J COIL  
L306 PU59152-221J COIL  
L307 PU48530-821J COIL  
L308 PU48530-101K COIL  
L309 PU59152-100J COIL  
L310 PU59152-100J COIL

L311 PU59153-822J COIL  
L312 PU59153-101K COIL  
L313 PU59153-101K COIL  
L314 PU48530-101K COIL  
L316 PU59152-150J COIL  
L317 PU48530-101K COIL

EQ301 PU60811-2 EQUALIZER  
LPF301 PU58022 LOW PASS FILTER  
BPF301 PU57072 BAND PASS FILTER  
OR PU57072-2  
BPF302 PU60654 BAND PASS FILTER  
OR PU60654-2 BAND PASS FILTER

△ CF301 PU57073 CERAMIC FILTER

DL301 PU58971-3 COMB FILTER

△ X301 PU60653 CRYSTAL UNITS

T301 PU49057 LC BLOCK,APC ERROR PHASE

TP6 PU56008 TEST-PIN  
TP10 PU57545 TEST PIN, X37

-AUDIO SECTION-

IC601 BA7751ALS IC

Q601 2SC1740S(RS) TRANSISTOR  
Q603 2SC1740S(RS) TRANSISTOR  
Q605 2SC1740S(RS) TRANSISTOR  
Q606 DTA124ES TRANSISTOR  
Q607 DTA114ES TRANSISTOR  
Q608 2SC1740S(RS) TRANSISTOR  
Q609 2SC1740S(RS) TRANSISTOR  
Q610 2SC1740S(RS) TRANSISTOR

Q611 DTA144ES TRANSISTOR  
Q612 DTA114ES TRANSISTOR  
Q613 DTC144EF TRANSISTOR  
Q614 DTC144EF TRANSISTOR

D601 1SS133 DIODE

#△ REF NO. PART NO. PART NAME, DESCRIPTION

OR MA165 DIODE  
D602 1SS133 DIODE  
OR MA165 DIODE  
D604 1SS133 DIODE

R601 QRD161J-473 RESISTOR  
R602 QRD161J-152 RESISTOR  
R603 QRD161J-222 RESISTOR  
R608 QRD161J-152 RESISTOR  
R609 QRD161J-222 RESISTOR

R613 QRD161J-223 RESISTOR  
R616 QRD161J-122 RESISTOR  
R617 QRD161J-122 RESISTOR  
R620 QRD161J-103 RESISTOR

R621 QRD161J-333 RESISTOR  
R623 QRD161J-223 RESISTOR  
R625 QRD161J-223 RESISTOR  
R626 QRD161J-100 RESISTOR  
R627 QRD161J-470 RESISTOR  
R628 QRD161J-223 RESISTOR  
R629 QRD161J-331 RESISTOR  
R630 QRD161J-224 RESISTOR

R631 QRD161J-123 RESISTOR  
R632 QRD161J-562 RESISTOR  
R633 QVZ3518-103 V RESISTOR,PB LEVEL  
R634 QRD161J-103 RESISTOR  
R635 QRD161J-122 RESISTOR  
R636 QRD161J-472 RESISTOR  
R637 QRD161J-393 RESISTOR  
R638 QRD161J-273 RESISTOR  
R639 QRD161J-122 RESISTOR  
R640 QRD161J-181 RESISTOR

R641 QVZ3518-473 V RESISTOR,BIAS ADJ  
R642 QRD161J-333 RESISTOR  
R643 QRD161J-2R2 RESISTOR  
R644 QRD161J-104 RESISTOR  
△ R645 QRD161J-270 RESISTOR  
R646 QRD161J-103 RESISTOR  
R647 QRD161J-332 RESISTOR  
R648 QRD161J-103 RESISTOR

C601 QEK51CM-336 E CAPACITOR  
C602 QEK61HM-105 E CAPACITOR  
C603 QCXB1CM-682 CAPACITOR  
C604 QEK61CM-336 E CAPACITOR  
C605 QEK61EM-475 E CAPACITOR  
C606 QFL31HJ-182 M CAPACITOR  
C607 QFL31HJ-222 M CAPACITOR  
C608 PU60550-105 E CAPACITOR  
C609 QEK61CM-106 E CAPACITOR  
C610 QFV71HJ-103 M CAPACITOR

C611 QEK61HM-224 E CAPACITOR  
C612 QEK61HM-105 E CAPACITOR  
C613 QEK61CM-226 E CAPACITOR  
C614 QEK61HM-225 E CAPACITOR  
C615 QEK61HM-106 E CAPACITOR  
C616 QEK61CM-106 E CAPACITOR  
C617 QFV71HJ-273 M CAPACITOR  
C618 QFV71HJ-153 TF CAPACITOR  
C619 QCB81HJ-331 CAPACITOR  
C620 QFV71HJ-563 TF CAPACITOR

C621 QEK61CM-476 E CAPACITOR  
C622 QCXB1CN-122 CAPACITOR  
C623 QCC11EJ-472 CAPACITOR  
C624 QCC31EK-272 CAPACITOR  
C625 QEK61CM-106 E CAPACITOR  
C626 QFP42AF-682M PP CAPACITOR  
C627 QFN31HK-222 M CAPACITOR

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C628	QEK41CM-107	E CAPACITOR
	C629	QFL41HJ-562	TF CAPACITOR
	L601	PU58308-103J	COIL
	K603	PGZ00354	FERRITE BEADS
	K604	PGZ00354	FERRITE BEADS
Δ	T601	PU59949	OSC TRANSFORMER
	TP631	PU54983	TEST PIN, X4(TP631-634)
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*****			
* 7. D/C SERVO BOARD ASSY <05> *			
*****			
PWBA	PRK10029A	D/C SERVO BOARD ASSY	
IC1	HD49722NT	IC	
IC2	BU2767S	IC	
IC3	TC4S66F	IC	
Q1	DTC144EU	TRANSISTOR	
Q2	DTC144EU	TRANSISTOR	
Q3	DTA124EU	TRANSISTOR	
Q4	DTC144EU	TRANSISTOR	
Q5	DTC124EU	TRANSISTOR	
Q6	DTC144EU	TRANSISTOR	
Q7	DTA144EU	TRANSISTOR	
Q8	DTA124EU	TRANSISTOR	
Q9	DTA124EU	TRANSISTOR	
Q10	DTA124EU	TRANSISTOR	
Q11	DTA124EU	TRANSISTOR	
D1	1SS133	DIODE	
D2	1SS133	DIODE	
D3	1SS133	DIODE	
D4	1SS133	DIODE	
D5	1SS133	DIODE	
D6	1SS133	DIODE	
D8	1SS133	DIODE	
D9	1SS133	DIODE	
D10	1SS133	DIODE	
D11	1SS133	DIODE	
D12	1SS133	DIODE	
D13	1SS133	DIODE	
D14	1SS133	DIODE	
D15	1SS133	DIODE	
D16	1SS133	DIODE	
D17	1SS133	DIODE	
D18	1SS133	DIODE	
D19	1SS133	DIODE	
D20	1SS133	DIODE	
D21	1SS133	DIODE	
D22	1SS133	DIODE	
D23	1SS133	DIODE	
R1	QRSA08J-104	RESISTOR	
R2	QRSA08J-562Y	RESISTOR	
R3	QRSA08J-273YN	RESISTOR	
R4	QRSA08J-473	RESISTOR	
R5	QRSA08J-393YN	RESISTOR	
R6	QRSA08J-392YN	RESISTOR	
R7	QRSA08J-683YN	RESISTOR	
R8	QRSA08J-123YN	RESISTOR	
R9	QRSA08J-332YN	RESISTOR	
R10	QRSA08J-472	RESISTOR	

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R11	QRSA08J-124Y	CHIP RESISTOR
	R12	QRSA08J-103Y	RESISTOR
	R13	QRSA08J-102	RESISTOR
	R14	QRSA08J-334YN	RESISTOR
	R15	QRSA08J-824YN	RESISTOR
	R16	QVZ3521-105	V.R,SLOW TK PRESET(SP)
	R17	QRSA08J-184YN	RESISTOR
	R18	QVZ3521-105	V.R,SLOW TK PRESET(LP)
	R19	QRSA08J-274YN	RESISTOR
	R20	QRSA08J-824YN	RESISTOR
	R21	QRSA08J-683YN	RESISTOR
	R22	QRSA08J-103Y	RESISTOR
	R23	QRSA08J-102	RESISTOR
	R24	QRSA08J-223Y	RESISTOR
	R26	QRSA08J-334YN	RESISTOR
	R27	QRSA08J-392YN	RESISTOR
	R28	QRSA08J-103Y	RESISTOR
	R29	QRSA08J-104	RESISTOR
	R30	QRSA08J-222	RESISTOR
	R31	QRSA08J-823YN	RESISTOR
	R32	QRSA08J-105YN	RESISTOR
	R33	QRSA08J-393YN	RESISTOR
	R34	QRSA08J-333YN	RESISTOR
	R35	QRSA08J-683YN	RESISTOR
	R36	QRSA08J-153	RESISTOR
	R37	QRSA08J-223Y	RESISTOR
	R38	QRSA08J-105YN	RESISTOR
	R39	QRSA08J-103Y	RESISTOR
	R40	QRSA08J-102	RESISTOR
	R41	QRSA08J-103Y	RESISTOR
	R42	QRSA08J-123YN	RESISTOR
	R43	QRSA08J-274YN	RESISTOR
	R44	QRSA08J-105YN	RESISTOR
	R45	QRSA08J-105YN	RESISTOR
	R46	QRSA08J-273YN	RESISTOR
	R47	QRSA08J-222	RESISTOR
	R48	QRSA08J-563YN	RESISTOR
	R49	QRSA08J-105YN	RESISTOR
	R50	QRSA08J-273YN	RESISTOR
	R51	QRSA08J-154YN	RESISTOR
	R52	QRSA08J-154YN	RESISTOR
	R54	QRSA08J-102	RESISTOR
	R55	QVZ3521-684	V RESISTOR,PB SW POINT TK
	R56	QRSA08J-104	RESISTOR
	R57	QRSA08J-823YN	RESISTOR
	R58	QRSA08J-222	RESISTOR
	R59	QVZ3521-474	V RESISTOR, X2 PB(LP)
	R60	QVZ3521-474	V RESISTOR,TRACKING PRESET
	R61	QVZ3521-474	V RESISTOR, X2 PB TK(SP)
	R62	QRSA08J-103Y	RESISTOR
	R63	QRSA08J-102	RESISTOR
	R64	QRSA08J-155YN	RESISTOR
	R66	QRSA08J-102	RESISTOR
	R67	QRSA08J-102	RESISTOR
	R68	QRSA08J-102	RESISTOR
	R69	QRSA08J-102	RESISTOR
	R70	QRSA08J-104	RESISTOR
	R71	QRSA08J-332YN	RESISTOR
	R72	QRSA08J-102	RESISTOR
	R73	QRSA08J-182Y	RESISTOR
	R74	QRSA08J-104	RESISTOR
	R75	QRSA08J-0R0	RESISTOR
	R76	QRSA08J-0R0	RESISTOR
B1	QRSA08J-0R0	RESISTOR, X46	
C1	QFV71HJ-224	M CAPACITOR	

#△ REF NO. PART NO. PART NAME, DESCRIPTION

C3	QFV71HJ-124	M CAPACITOR
C4	QFV71HJ-104	M CAPACITOR
C5	QFV71HJ-393	M CAPACITOR
C6	QEK61CM-226MZ	E CAPACITOR
C7	QCYA1HK-102	CAPACITOR
C8	QEK61CM-226MZ	E CAPACITOR
C9	QCC11CK-102	CAPACITOR
C10	QCTA1CH-101	CAPACITOR
C11	QCB81HJ-101	CAPACITOR
C14	QFV71HJ-474	M CAPACITOR
C16	QCYA1HK-102	CAPACITOR
C17	QCYA1HK-103	CAPACITOR
C18	QEK61CM-226MZ	E CAPACITOR
C19	QFV71HJ-334	M CAPACITOR
C20	QFL31HJ-682	M CAPACITOR
C21	QEK61EM-475MZ	E CAPACITOR
C22	QEK61EM-475MZ	E CAPACITOR
C23	QEK61CM-106MZ	E CAPACITOR
C24	QEK61CM-106MZ	E CAPACITOR
C25	QEN61HM-105MZ	NP E CAPACITOR
C26	QFV71HJ-104	M CAPACITOR
C27	QCYA1HK-102	CAPACITOR
C28	QCTA1CH-471	CAPACITOR
C29	QFL31HJ-682	M CAPACITOR
C30	QFL31HJ-102	M CAPACITOR
C31	QFV71HJ-124	M CAPACITOR
C32	QCYA1HK-102	CAPACITOR
C33	QCYA1HK-102	CAPACITOR
C34	QEK61AM-226MZ	E CAPACITOR
C35	QCTA1CH-101	CAPACITOR
C36	QEK61AM-226MZ	E CAPACITOR
C37	QCTA1CH-150	CAPACITOR
C38	QEK61HM-105	E CAPACITOR
C39	QEK61HM-105	E CAPACITOR
C40	QCYA1HK-103	CAPACITOR
C41	QCYA1HK-102	CAPACITOR
C42	QEK61CM-226MZ	E CAPACITOR
C43	QCTA1CH-101	CAPACITOR
C44	QCYA1HK-102	CAPACITOR
C45	QFV71HJ-334	M CAPACITOR
C46	QFV71HJ-394	M CAPACITOR
L1	PU48530-101K	COIL
L2	PU48530-101K	COIL
L3	PU48530-100K	COIL
TH1	NTH5D223KA OR NTH5D223LA	THERMISTOR THERMISTOR
TP1	PU56008	TEST-PIN, X9
CN1	PU58844-3	CAP HOUSING
CN2	PU58931-16	CAP HOUSING
CN3	PU58844-5	CAP HOUSING
CN4	PU58844-7R	CAP HOUSING
CN5	PU58844-7	CAP HOUSING
CN6	PU58844-5Y	CAP HOUSING
CN7	PU58931-20	CAP HOUSING

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\* 8. TIME LAPS SERVO BOARD ASSY <06> \*  
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PWBA	PRK10030A-01	TIME LAPSE SERVO BOARD ASSY
IC1	NJM2904S	IC

#△ REF NO. PART NO. PART NAME, DESCRIPTION

IC2	NJM2904S	IC
IC3	NJM2903S	IC
IC4	MN4030BS	IC
IC5	TA78L005AP	IC
IC6	TA78L009AP	IC
IC7	NJM2904S	IC
IC8	NJM2904S	IC
IC9	MN4053BS	IC
IC10	NJM2904S	IC
IC11	NJM2903S	IC
IC12	MN4053BS	IC
IC13	BA6302AF	IC
IC14	NJM2904S	IC
IC15	NJM2903S	IC
IC16	MN4013BS	IC
IC17	MN1280P	IC
IC18	MN4013BS	IC
IC19	MN4069UBS	IC
IC20	MN4081BS	IC
IC21	MN4081BS	IC
IC22	MN4538BS	IC
Q1	2SD973AQ,R,S	TRANSISTOR
Q2	DTC124EK	TRANSISTOR
Q3	2SD973AQ,R,S	TRANSISTOR
Q4	DTC124EK	TRANSISTOR
Q5	DTC124EK	TRANSISTOR
Q6	DTC144EK	TRANSISTOR
D1	1SS133	DIODE
D2	DA204K	DIODE
D4	DAN202K	CHIP DIODE ARRAY
D5	DAN202K	CHIP DIODE ARRAY
D6	DAN202K	CHIP DIODE ARRAY
D7	1SS133	DIODE
D8	1SS133	DIODE
D9	1SS133	DIODE
D10	1SS133	DIODE
D11	1SS133	DIODE
R1	QRSA08J-102	RESISTOR
R2	QRSA08J-333YN	RESISTOR
R3	QRSA08J-103Y	RESISTOR
R4	QVZ3521-102	V RESISTOR,FG A D ADJ
R5	QRSA08J-103Y	RESISTOR
R6	QRSA08J-102	RESISTOR
R7	QRSA08J-102	RESISTOR
R8	QRSA08J-333YN	RESISTOR
R9	QRSA08J-103Y	RESISTOR
R10	QVZ3521-102	V RESISTOR,FG B D ADJ
R11	QRSA08J-103Y	RESISTOR
R12	QRSA08J-222	RESISTOR
R13	QRSA08J-105YN	RESISTOR
R14	QRSA08J-103Y	RESISTOR
R15	QRSA08J-103Y	RESISTOR
R16	QRSA08J-222	RESISTOR
R17	QRSA08J-105YN	RESISTOR
R18	QRSA08J-103Y	RESISTOR
R19	QRSA08J-103Y	RESISTOR
R20	QRSA08J-104	RESISTOR
R22	QRSA08J-102	RESISTOR
R23	QRSA08J-102	RESISTOR
R24	QRSA08J-104	RESISTOR
R25	QRSA08J-102	RESISTOR
R27	QRSA08J-103Y	RESISTOR
R28	QRSA08J-182Y	RESISTOR
R29	QRSA08J-123YN	RESISTOR
R30	QRSA08J-102	RESISTOR

#A	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R31	QRSA08J-683YN	RESISTOR
	R32	QRSA08J-103Y	RESISTOR
	R33	QRSA08J-103Y	RESISTOR
	R34	QRSA08J-223Y	RESISTOR
	R35	QRSA08J-223Y	RESISTOR
	R36	QRSA08J-223Y	RESISTOR
	R37	QRSA08J-223Y	RESISTOR
	R38	QVZ3521-104	V RESISTOR,STOP S-2 ADJ
	R39	QRSA08J-223Y	RESISTOR
	R40	QRSA08J-122YN	RESISTOR
	R41	QRSA08J-103Y	RESISTOR
	R42	QRSA08J-103Y	RESISTOR
	R43	QVZ3521-332	V RESISTOR,STOP S-1 ADJ
	R44	QRSA08J-103Y	RESISTOR
	R45	QVZ3521-472	V RESISTOR,STOP S-3 ADJ
	R46	QRSA08J-103Y	RESISTOR
	R47	QRSA08J-684YN	RESISTOR
	R48	QRSA08J-223Y	RESISTOR
	R49	QRSA08J-103Y	RESISTOR
	R50	QRSA08J-103Y	RESISTOR
	R51	QRSA08J-102	RESISTOR
	R52	QRSA08J-103Y	RESISTOR
	R53	QRSA08J-104	RESISTOR
	R54	QRSA08J-102	RESISTOR
	R55	QRSA08J-102	RESISTOR
	R56	QVZ3521-154	V RESISTOR,TL D ADJ
	R57	QRSA08J-224YN	RESISTOR
	R58	QRSA08J-333YN	RESISTOR
	R59	QRSA08J-223Y	RESISTOR
	R60	QRSA08J-223Y	RESISTOR
	R61	QRSA08J-103Y	RESISTOR
	R62	QVZ3521-103	V RESISTOR,D REF ADJ
	R63	QRSA08J-104	RESISTOR
	R64	QRSA08J-682	RESISTOR
	R65	QRSA08J-104	RESISTOR
	R66	QRSA08J-104	RESISTOR
	R67	QRSA08J-104	RESISTOR
	R69	QRSA08J-103Y	RESISTOR
	R70	QRSA08J-223Y	RESISTOR
	R71	QRSA08J-102	RESISTOR
	R72	QRSA08J-103Y	RESISTOR
	R73	QRSA08J-473	RESISTOR
	R74	QRSA08J-333YN	RESISTOR
	R75	QVZ3521-103	V RESISTOR,TL ADV ADJ
	R76	QRSA08J-103Y	RESISTOR
	R77	QRSA08J-104	RESISTOR
	R78	QRSA08J-104	RESISTOR
	R79	QRSA08J-102	RESISTOR
	R80	QRSA08J-104	RESISTOR
	R81	QRSA08J-103Y	RESISTOR
	R82	QRSA08J-104	RESISTOR
	R83	QRSA08J-104	RESISTOR
	R84	QRSA08J-102	RESISTOR
	R85	QRSA08J-102	RESISTOR
	R86	QRSA08J-104	RESISTOR
	R87	QVZ3521-224	V RESISTOR,LIMIT D ADJ
	R88	QRSA08J-124Y	CHIP RESISTOR
	R89	QRSA08J-103Y	RESISTOR
	R90	QRSA08J-102	RESISTOR
	R91	QRSA08J-563YN	RESISTOR
	R92	QRSA08J-103Y	RESISTOR
	R93	QRSA08J-102	RESISTOR
	R94	ERT-02FHL103S	THERMISTOR
	C1	QCS31HJ-101	CAPACITOR
	C2	QER61CM-106GZ	E CAPACITOR
	C3	QCS31HJ-101	CAPACITOR
	C4	QER61CM-106GZ	E CAPACITOR

#A	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C5	QCS31HJ-101	CAPACITOR
	C6	QCS31HJ-101	CAPACITOR
	C7	QFV41HJ-684	TF CAPACITOR
	C8	QER61CM-226	E CAPACITOR
	C9	QCF31HP-103	CAPACITOR
	C10	QCF31HP-103	CAPACITOR
	C11	QER61CM-226	E CAPACITOR
	C12	QCF31HP-103	CAPACITOR
	C13	QER61CM-226	E CAPACITOR
	C14	QCF31HP-103	CAPACITOR
	C15	QER61CM-226	E CAPACITOR
	C16	QCF31HP-103	CAPACITOR
	C17	QER61CM-226	E CAPACITOR
	C18	QER61CM-226	E CAPACITOR
	C19	QCF31HP-103	CAPACITOR
	C20	QFN31HK-223	M CAPACITOR
	C21	QCS31HJ-330	CAPACITOR
	C22	QCF31HP-103	CAPACITOR
	C24	QER61CM-226	E CAPACITOR
	C25	QER61CM-226	E CAPACITOR
	C26	QCS31HJ-221	CAPACITOR
	C27	QFP42AJ-272	PP CAPACITOR
	C29	QFN31HJ-392	M CAPACITOR
	C30	QCF31HP-102	CAPACITOR
	C31	QER61CM-226	E CAPACITOR
	C32	QER61HM-104GZ	E CAPACITOR
	C33	QCF31HP-102	CAPACITOR
	C34	QER61HM-105GZ	E CAPACITOR
	C35	QCF31HP-102	CAPACITOR
	C36	QCF31HP-102	CAPACITOR
	C37	QCF31HP-102	CAPACITOR
	C38	QFN31HJ-103	M CAPACITOR
	C39	QCS31HJ-391	CAPACITOR
	C40	QER61CM-226	E CAPACITOR
	L1	PU53223-101J	COIL
	L2	PU53223-101J	COIL
	L3	PU53223-101J	COIL
	TH1	PU52108-100K	POSITIVE THERMISTOR
	TP1	PU54983	TEST PIN, X13
	CN1	PU58844-5	CAP HOUSING
	CN2	PU58844-5Y	CAP HOUSING
	CN3	PU58929-16	HOUSING
	CN4	PU58929-16	HOUSING
	△ CP1	ICP-F38	CIRCUIT PROTECTOR

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 \* 9. MECHACON BOARD ASSY <07> \*  
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PWBA	PRK10040A-05	MECHACON BOARD ASSY
IC1	M50938E-349SP	IC
IC2	BA6259N	IC
IC3	M50255P	IC
IC4	M51957BL	IC
IC101	VC2032	IC
IC102	MN4053B	IC
IC103	MN4053B	IC
IC104	VC2064	IC
IC105	VC2064	IC
IC106	VC2032	IC



#A REF NO. PART NO. PART NAME, DESCRIPTION

Q1	2SD973AR	TRANSISTOR
Q2	DTC144EF	TRANSISTOR
Q3	DTC144EF	TRANSISTOR
Q6	DTA144EF	TRANSISTOR
Q101	DTA124EF	TRANSISTOR
Q102	2SD637R,S	TRANSISTOR
Q103	2SD637R,S	TRANSISTOR
Q104	2SD637R,S	TRANSISTOR
D1	HZS4.3EB2	ZENER DIODE
D2	1SS133	DIODE
D3	1SS133	DIODE
D4	1SS133	DIODE
D6	1SS133	DIODE
D8	1SS133	DIODE
D9	HZS7.5EB2	ZENER DIODE
D10	MC921	DIODE
D11	1SS133	DIODE
D12	1SS133	DIODE
D13	1SS133	DIODE
D101	1SS133	DIODE
D102	1SS133	DIODE
D103	1SS133	DIODE
D104	1SS133	DIODE
R1	QRD161J-332	RESISTOR
R2	QRD161J-122	RESISTOR
R3	QRD161J-823	RESISTOR
R4	QRD161J-102	RESISTOR
R5	QRD161J-102	RESISTOR
R6	QRD161J-103	RESISTOR
R7	QRD161J-102	RESISTOR
R8	QRD161J-103	RESISTOR
R9	QRD161J-472	RESISTOR
R10	QRD161J-103	RESISTOR
R11	QRD161J-105	RESISTOR
R12	QRD161J-472	RESISTOR
R13	QRD161J-472	RESISTOR
R14	QRD161J-472	RESISTOR
R15	QRD161J-472	RESISTOR
R16	QRD161J-472	RESISTOR
R17	QRD161J-472	RESISTOR
R18	QRD161J-472	RESISTOR
R19	QRD161J-124	RESISTOR
R20	QRD161J-472	RESISTOR
R21	QRD161J-124	RESISTOR
R22	QRD161J-472	RESISTOR
R23	QRD161J-333	RESISTOR
R24	QRD161J-472	RESISTOR
R25	QRD161J-472	RESISTOR
R26	QRD161J-472	RESISTOR
R27	QRD161J-472	RESISTOR
R28	QRD161J-472	RESISTOR
R29	QRD161J-103	RESISTOR
R30	QRD161J-102	RESISTOR
R31	QRD161J-103	RESISTOR
R32	QRD161J-331	RESISTOR
R33	QRD161J-822	RESISTOR
R34	QRD161J-103	RESISTOR
R35	QRD161J-223	RESISTOR
R36	QRD161J-152	RESISTOR
R37	QRD161J-103	RESISTOR
R38	QRD161J-103	RESISTOR
R39	QRD161J-103	RESISTOR
R41	QRD161J-472	RESISTOR
R42	QRD161J-472	RESISTOR

#A REF NO. PART NO. PART NAME, DESCRIPTION

R43	QRD161J-472	RESISTOR
R44	QRD161J-472	RESISTOR
R45	QRD161J-102	RESISTOR
R46	QRD161J-103	RESISTOR
R47	QRD161J-103	RESISTOR
R48	QRD161J-103	RESISTOR
R49	QRD161J-103	RESISTOR
R51	QRD161J-102	RESISTOR
R52	QRD161J-102	RESISTOR
R53	QRD161J-103	RESISTOR
R54	QRD161J-103	RESISTOR
R55	QRD161J-103	RESISTOR
R56	QRD161J-103	RESISTOR
R57	QRD161J-103	RESISTOR
R58	QRD161J-472	RESISTOR
R59	QRD161J-103	RESISTOR
R60	QRD161J-103	RESISTOR
R61	QRD161J-103	RESISTOR
R62	QRD161J-103	RESISTOR
R63	QRD161J-472	RESISTOR
R64	QRD161J-182	RESISTOR
R81	QRG016J-221A	OMF RESISTOR
R101	QRD161J-222	RESISTOR
R102	QRD161J-222	RESISTOR
R103	QRD161J-562	RESISTOR
R104	QRD161J-102	RESISTOR
R105	QRD161J-102	RESISTOR
R106	QRD161J-103	RESISTOR
R107	QRD161J-222	RESISTOR
R108	QRD161J-222	RESISTOR
R109	QRD161J-124	RESISTOR
R110	QRD161J-223	RESISTOR
R111	QRD161J-223	RESISTOR
R112	QRD161J-103	RESISTOR
R113	QRD161J-333	RESISTOR
R114	QRD161J-333	RESISTOR
R115	QRD161J-222	RESISTOR
R116	QRD161J-222	RESISTOR
R117	QRD161J-222	RESISTOR
R118	QRD161J-0R0	RESISTOR
R119	QRD161J-0R0	RESISTOR
R120	QRD161J-0R0	RESISTOR
R124	QRD161J-222	RESISTOR
R125	QRD161J-222	RESISTOR
R126	QRD161J-222	RESISTOR
R127	QRD161J-103	RESISTOR
R128	QRD161J-103	RESISTOR
R129	QRD161J-102	RESISTOR
R130	QRD161J-222	RESISTOR
R131	QRD161J-222	RESISTOR
R132	QRD161J-222	RESISTOR
R133	QRD161J-222	RESISTOR
R134	QRD161J-222	RESISTOR
R135	QRD161J-222	RESISTOR
R136	QRD161J-0R0	RESISTOR
R137	QRD161J-0R0	RESISTOR
R139	QRD161J-0R0	RESISTOR
R142	QRD161J-102	RESISTOR
R143	QRD161J-334	RESISTOR
R144	QRD161J-124	RESISTOR
R145	QRD161J-0R0	RESISTOR
R146	QRD161J-103	RESISTOR
R147	QRD161J-103	RESISTOR
R148	QRD161J-561	RESISTOR
R149	QRD161J-103	RESISTOR
R150	QRD161J-102	RESISTOR
RA1	QRB047J-472	RESISTOR ARRAY

#Δ	REF NO.	PART NO.	PART NAME, DESCRIPTION
	OR	QRB049J-472	RESISTOR ARRAY
RA2		QRB047J-103	RESISTOR ARRAY
	OR	QRB049J-103	RESISTOR ARRAY
B2		QRD161J-OR0	RESISTOR
B3		QRD161J-OR0	RESISTOR
C1		QCC11EK-473	CAPACITOR
C2		QCB11HJ-101	CAPACITOR
C3		QCB11HJ-101	CAPACITOR
C4		QCC11EK-473	CAPACITOR
C5		QETC1EM-475	E CAPACITOR
C6		QCF31HP-223	CAPACITOR
C7		QCF31HP-223	CAPACITOR
C8		QCFB1EZ-223	CAPACITOR
C9		QETC1EM-335	E CAPACITOR
C10		QCFB1EZ-223	CAPACITOR
C11		QCB11HJ-101	CAPACITOR
C12		QCB11HJ-101	CAPACITOR
C13		QETC1HM-474	E CAPACITOR
C14		QCS31HJ-680	CAPACITOR
C15		QCS31HJ-680	CAPACITOR
C16		QCF31HP-473	CAPACITOR
C101		QCF31HP-103	CAPACITOR
C102		QER61CM-226	E CAPACITOR
C103		QCS31HJ-101	CAPACITOR
C104		QCF31HP-103	CAPACITOR
C105		QER61CM-226	E CAPACITOR
C106		QER61CM-226	E CAPACITOR
C107		QCF31HP-103	CAPACITOR
C108		QCS31HJ-101	CAPACITOR
C109		QCS31HJ-101	CAPACITOR
C110		QER61CM-106	E CAPACITOR
C111		QCF31HP-102	CAPACITOR
L1		PU59152-100J	COIL
L101		PU59152-101J	COIL
L102		PU59152-101J	COIL
Δ CF1		PU60030	RESONATOR
K1		PGZ00354	FERRITE BEADS
K2		PGZ00354	FERRITE BEADS
K3		PGZ00354	FERRITE BEADS
K4		PGZ00354	FERRITE BEADS
K5		PGZ00354	FERRITE BEADS
K6		PGZ00354	FERRITE BEADS
K7		PGZ00354	FERRITE BEADS
SKT1		PGZ01428-064	IC SOCKET, (FOR IC1)
WR1		PW30112-LOAF6AH	PARALLEL WIRE
J101		QWE251-04A2A2	WIRE
J102		QWE252-07A2A2	WIRE
TP1		PU54983	TEST PIN, X3
CN1		PU58844-2	CAP HOUSING
CN2		PU58930-16	CAP HOUSING
CN3		PU58928-16	CAP HOUSING
CN4		PU58928-16	CAP HOUSING
CN5		PU58844-3	CAP HOUSING
CN6		PU58844-3R	CAP HOUSING
CN7		PU58930-20	CAP HOUSING
CN8		PU58844-2R	CAP HOUSING
CN10		PU58844-8	CAP HOUSING
CN11		PU58844-15	CAP HOUSING
CN12		PU58844-9Y	CAP HOUSING
CN13		PU58844-9	CAP HOUSING

#Δ	REF NO.	PART NO.	PART NAME, DESCRIPTION
	CN14	PU58844-9R	CAP HOUSING
	CN15	PU58844-4	CAP HOUSING
	CN16	PU58844-5	CAP HOUSING
	CN17	PU58844-6	CAP HOUSING
	CN18	PU59934-17	WIRE HOLDER
	CN19	PU58844-8Y	CAP HOUSING
	CN20	PU58844-5R	CAP HOUSING
	CN21	PU58844-5Y	CAP HOUSING
	CN22	PU58844-6R	CAP HOUSING
	CN23	PU58844-6Y	CAP HOUSING
	CN24	PU58844-7	CAP HOUSING
	CN25	PU58844-9Y	CAP HOUSING
	CN26	PU58844-14	CAP HOUSING
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* 10. TIME LAPS SUB SERVO BOARD (1) ASSY <08*			
*****			
	PWBA	PGE20321A	TIME LAPSE SUB SERVO B.ASSY
	PWBA1	PGE20321A1	TL SUB SERVO BOARD (1) ASSY
	IC1	UPD75008CU-71A	IC
	IC2	TC4069UBP	IC
	IC3	IC-PST523H-2	IC
	Q2	DTC114EF	TRANSISTOR
	Q3	DTC114EF	TRANSISTOR
	Q4	DTC114EF	TRANSISTOR
	Q5	DTA124EF	TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	RD7.5ES-T181	ZENER DIODE
	D4	1SS133	DIODE
	D5	1SS133	DIODE
	D6	1SS133	DIODE
	R1	QRD161J-103	RESISTOR
	R2	QRD161J-103	RESISTOR
	R4	QRD161J-103	RESISTOR
	R5	QRD161J-472	RESISTOR
	R6	QRD161J-102	RESISTOR
	R7	QRD161J-102	RESISTOR
	R8	QRD161J-102	RESISTOR
	R9	QRD161J-102	RESISTOR
	R10	QRD161J-102	RESISTOR
	R11	QRD161J-102	RESISTOR
	R12	QRD161J-102	RESISTOR
	R13	QRD161J-102	RESISTOR
	R14	QRD161J-102	RESISTOR
	R15	QRD161J-102	RESISTOR
	R16	QRD161J-102	RESISTOR
	R17	QRD161J-102	RESISTOR
	R18	QRD161J-563	RESISTOR
	R19	QRD161J-102	RESISTOR
	R20	QRD161J-123	RESISTOR
	R21	QRD161J-682	RESISTOR
	R22	QRD161J-471	RESISTOR
	R23	QRD161J-471	RESISTOR
	R24	QRD161J-103	RESISTOR
	R25	QRD161J-103	RESISTOR
	R26	QRD161J-103	RESISTOR
	R27	QRD161J-103	RESISTOR
	R28	QRD161J-103	RESISTOR
	R29	QRD161J-682	RESISTOR
	R30	QRD161J-103	RESISTOR

#Δ REF NO. PART NO. PART NAME, DESCRIPTION

R31 QRD161J-154 RESISTOR  
R32 QRD161J-102 RESISTOR  
R33 QRD161J-102 RESISTOR  
R34 QRD161J-102 RESISTOR  
R35 QRD161J-102 RESISTOR  
R36 QRD161J-102 RESISTOR  
R37 QRD161J-102 RESISTOR  
R38 QRD161J-102 RESISTOR  
R39 QRD161J-102 RESISTOR  
R40 QRD161J-102 RESISTOR

R41 QRD161J-102 RESISTOR  
R42 QRD161J-102 RESISTOR  
R43 QRD161J-102 RESISTOR  
R44 QRD161J-102 RESISTOR  
R45 QRD161J-0R0 RESISTOR  
R46 QRD161J-103 RESISTOR  
R47 QRD161J-103 RESISTOR  
R48 QRD161J-102 RESISTOR  
R49 QRD161J-103 RESISTOR  
R50 QRD161J-103 RESISTOR

R51 QRD161J-103 RESISTOR  
R52 QRD161J-102 RESISTOR  
R55 QRD161J-103 RESISTOR

RA1 QRB087J-104 RESISTOR ARRAY  
RA2 QRB077J-104 RESISTOR ARRAY

C1 QFN31HJ-102 M CAPACITOR  
C2 QFN31HJ-102 M CAPACITOR  
C3 QER61CM-226 E CAPACITOR  
C4 QER61CM-226 E CAPACITOR  
C5 QER61CM-106 E CAPACITOR  
C6 QCS11HJ-391 CAPACITOR  
C7 QCS11HJ-391 CAPACITOR

L1 PU59152-101J COIL

Δ CF1 PU59576 RESONATOR

BUZ1 PGZ01299 BUZZER

SKT1 PGZ01313 IC SOCKET, (FOR IC1)

TP1 PU54983 TEST PIN, X5

CN1 PU58844-15Y CAP HOUSING  
CN2 PU58844-15 CAP HOUSING  
CN3 PU58844-10 CAP HOUSING

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\* 11. TIME LAPS SUB SERVO BOARD (2) ASSY <09>  
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PWBA2 PGE20321A2 TL SUB SERVO BOARD(2)ASSY

IC101 BU4538B IC  
IC102 BU4538B IC  
IC103 BA6302A IC  
IC104 UPC393C IC

D101 1SS133 DIODE  
D102 1SS133 DIODE  
D103 1SS133 DIODE

R101 QVZ3521-104 V.R.REC CTL WIDTH ADJ  
R102 QRD161J-104 RESISTOR  
R103 QRD161J-154 RESISTOR

#Δ REF NO. PART NO. PART NAME, DESCRIPTION

R104 QVZ3521-224 V.R.REC CTL POS.ADJ  
R105 QRD161J-103 RESISTOR  
R106 QVZ3521-474 V.R.DRUM ADD PULSE POS.  
R107 QRD161J-333 RESISTOR  
R108 QRD161J-183 RESISTOR  
R109 ERT-D2FHL103S THERMISTOR  
R110 QRD161J-102 RESISTOR

R111 QVZ3521-334 V.R.DRUM ADD PULSE WIDTH  
R112 QRD161J-104 RESISTOR  
R113 QRD161J-274 RESISTOR  
R114 QRD161J-103 RESISTOR  
R115 QRD161J-103 RESISTOR  
R116 QRD161J-682 RESISTOR  
R117 QRD161J-223 RESISTOR  
R118 QRD161J-823 RESISTOR  
R119 QRD161J-394 RESISTOR  
R120 QRD161J-334 RESISTOR

R121 QRD161J-223 RESISTOR  
R122 QVZ3521-104 V.R.SPD F-V ADJ(LP)  
R123 QVZ3521-473 V.R.SPD F-V ADJ(SP)  
R124 QRD161J-103 RESISTOR  
R125 QRD161J-102 RESISTOR  
R126 QVZ3521-105 V.R.DRUM A.P.POS.(24H)

C101 QFV71HJ-104 M CAPACITOR  
C102 QFV71HJ-104 M CAPACITOR  
C103 QFV71HJ-104 M CAPACITOR  
C104 QFV71HJ-104 M CAPACITOR  
C105 QER61HM-105 E CAPACITOR  
C106 QER61CM-106 E CAPACITOR  
C107 QFN31HK-223 M CAPACITOR  
C108 QFN31HK-103 M CAPACITOR

TP101 PU54983 TEST PIN

CN5 PGZ01081-08 MICRO HEADER  
CN6 PGZ01081-07 MICRO HEADER

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\* 12. VIDEO SUB BOARD ASSY <10>  
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PWB PRK30034A VIDEO SUB BOARD ASSY

IC1 BU3791 IC

Q1 DTC144ES TRANSISTOR  
Q2 DTC124ES TRANSISTOR  
Q3 DTC144WS TRANSISTOR

D1 1SS133 DIODE

R1 QRD161J-103 RESISTOR  
R2 QRD161J-104 RESISTOR  
R3 QRD161J-104 RESISTOR  
R4 QRD161J-104 RESISTOR  
R5 QRD161J-104 RESISTOR  
R6 QRD161J-822 RESISTOR  
R7 QRD161J-104 RESISTOR  
R8 QRD161J-103 RESISTOR  
R9 QRD161J-563 RESISTOR  
R10 QRD161J-472 RESISTOR

C1 QCB81HJ-102 CAPACITOR  
C2 QCC11CK-104 CAPACITOR  
C3 QCB81HJ-102 CAPACITOR  
C4 QCB81HJ-121 CAPACITOR  
C5 QEK61AM-336 E CAPACITOR

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C6	QFN31HJ-103	M CAPACITOR
	CN1	PU58844-7	CAP HOUSING
	CN2	PU58844-7R	CAP HOUSING
	CN3	PU58844-5	CAP HOUSING
	CN4	PU58844-3	CAP HOUSING
	CN5	PU58844-2	CAP HOUSING
*****			
	***** * 13. AC HEAD BOARD <12> *		
	*****		
	PWB	PB40029	AUDIO/CONTROL HEAD PWB
	CN1	PU58844-103	CAP HOUSING
	CN2	PU58844-104B	CAP HOUSING
*****			
	***** * 14. UPPER DRUM BOARD <41> *		
	*****		
	PWB	PDM3017	UPPER DRUM BOARD
*****			
	***** * 15. PRE/REC BOARD ASSY <43> *		
	*****		
	PWBA	PRK10031A-02	PRE/REC BOARD ASSY
	IC1	TA8609P	IC
	IC2	TA8733F	IC
	IC3	MN4052BS	IC
	IC4	AN6392	IC
	IC5	TC4S81F	IC
	IC6	TC4S71F	IC
	Q1	2SC2412K	TRANSISTOR
	Q2	2SC2412K	TRANSISTOR
	Q3	2SC2412K	TRANSISTOR
	Q4	2SC2412K	TRANSISTOR
	Q5	2SA1036K(R)	TRANSISTOR
	Q6	DTC124EK	TRANSISTOR
	Q7	2SA1036K(R)	TRANSISTOR
	Q8	2SC2412K	TRANSISTOR
	Q9	2SC2412K	TRANSISTOR
	Q10	2SC2412K	TRANSISTOR
	Q11	2SA1037K	TRANSISTOR
	Q12	DTC144EK	TRANSISTOR
	Q13	2SA1037K	TRANSISTOR
	Q14	DTC144EK	TRANSISTOR
	Q15	2SA1037K	TRANSISTOR
	Q16	DTC144EK	TRANSISTOR
	Q17	DTC144WK	TRANSISTOR
	Q19	DTC124EK	TRANSISTOR
	Q101	DTA124EK	TRANSISTOR
	Q103	DTC124EK	TRANSISTOR
	Q107	2SC2412K	TRANSISTOR
	Q108	2SA1037K	TRANSISTOR
	Q109	2SC2412K	TRANSISTOR
	Q110	2SA1037K	TRANSISTOR

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
	Q111	DTC124EK	TRANSISTOR
	Q112	2SC2412K	TRANSISTOR
	D1	DAN202K	CHIP DIODE ARRAY
	D2	DAN202K	CHIP DIODE ARRAY
	D3	DAN202K	CHIP DIODE ARRAY
	D4	DAN202K	CHIP DIODE ARRAY
	D5	DAN202K	CHIP DIODE ARRAY
	D6	DAN202K	CHIP DIODE ARRAY
	D7	DAN202K	CHIP DIODE ARRAY
	D102	DAP202K	DIODE
	D103	DAN202K	CHIP DIODE ARRAY
	R1	QRSA08J-100YN	RESISTOR
	R2	QRSA08J-272YN	RESISTOR
	R3	QRSA08J-100YN	RESISTOR
	R4	QRSA08J-272YN	RESISTOR
	R5	QRSA08J-103Y	RESISTOR
	R6	QRSA08J-100YN	RESISTOR
	R7	QRSA08J-272YN	RESISTOR
	R8	QRSA08J-100YN	RESISTOR
	R9	QRSA08J-272YN	RESISTOR
	R10	QRSA08J-103Y	RESISTOR
	R11	QRSA08J-102	RESISTOR
	R12	QVZ3531-152	V RESISTOR,LP CH2 Q
	R13	QVZ3531-152	V RESISTOR,LP CH1 Q
	R14	QRSA08J-103Y	RESISTOR
	R15	QVZ3531-152	V RESISTOR,SP CH2 Q
	R16	QRSA08J-102	RESISTOR
	R17	QRSA08J-821YN	RESISTOR
	R18	QVZ3531-152	V RESISTOR,SP CH1 Q
	R19	QRD161J-333	RESISTOR
	R20	QRSA08J-101YN	RESISTOR
	R21	QRSA08J-393YN	RESISTOR
	R22	QRSA08J-222	RESISTOR
	R23	QRSA08J-103Y	RESISTOR
	R24	QRSA08J-103Y	RESISTOR
	R25	QRSA08J-393YN	RESISTOR
	R26	QRD161J-222	RESISTOR
	△ R27	PUS2108-150	POSITIVE THERMISTOR
	R28	QRSA08J-221Y	RESISTOR
	R29	QRSA08J-102	RESISTOR
	R30	QRSA08J-122YN	RESISTOR
	R31	QRSA08J-221Y	RESISTOR
	R32	QRSA08J-102	RESISTOR
	R33	QRSA08J-122YN	RESISTOR
	R34	QRSA08J-103Y	RESISTOR
	R35	QRSA08J-122YN	RESISTOR
	R36	QRSA08J-103Y	RESISTOR
	R37	QRSA08J-122YN	RESISTOR
	R38	QRSA08J-103Y	RESISTOR
	R39	QRSA08J-122YN	RESISTOR
	R40	QRSA08J-393YN	RESISTOR
	R41	QRSA08J-821YN	RESISTOR
	R42	QRSA08J-393YN	RESISTOR
	R43	QRSA08J-681YN	RESISTOR
	R44	QRSA08J-393YN	RESISTOR
	R45	QRSA08J-681YN	RESISTOR
	R46	QRSA08J-623YN	RESISTOR
	R47	QRSA08J-821YN	RESISTOR
	R48	QRSA08J-680YN	RESISTOR
	R49	QRSA08J-102	RESISTOR
	R50	QRSA08J-222	RESISTOR
	R51	QRSA08J-332YN	RESISTOR
	R52	QRSA08J-123YN	RESISTOR
	R53	QRSA08J-680YN	RESISTOR
	R54	QRSA08J-472	RESISTOR

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R55	QRSA08J-102	RESISTOR
	R56	QRSA08J-103Y	RESISTOR
	R57	QRSA08J-103Y	RESISTOR
	R58	QRSA08J-823YN	RESISTOR
	R59	QRSA08J-681YN	RESISTOR
	R60	QRSA08J-103Y	RESISTOR
	R61	QRSA08J-561YN	RESISTOR
	R101	QRSA08J-223Y	RESISTOR
	R102	QRSA08J-273YN	RESISTOR
	R115	QRSA08J-471YN	RESISTOR
	R116	QRSA08J-102	RESISTOR
	R117	QRSA08J-102	RESISTOR
	R118	QRSA08J-122YN	RESISTOR
	R119	QRSA08J-102	RESISTOR
	R120	QRSA08J-102	RESISTOR
	R121	QRSA08J-471YN	RESISTOR
	R122	QRSA08J-561YN	RESISTOR
	R123	QRSA08J-122YN	RESISTOR
	R124	QRSA08J-821YN	RESISTOR
	R125	QRSA08J-102	RESISTOR
	R126	QRSA08J-122YN	RESISTOR
	R127	QRSA08J-222	RESISTOR
	R128	QRSA08J-681YN	RESISTOR
	R129	QRSA08J-101YN	RESISTOR
	R130	PU57457-682	V RESISTOR, SP EQ
	R131	PU57457-332	V RESISTOR, LP EQ
	R134	QRSA08J-102	RESISTOR
	C1	QCFA1HZ-103	CAPACITOR
	C2	QCFA1HZ-103	CAPACITOR
	C3	QCFA1HZ-103	CAPACITOR
	C4	QCFA1HZ-103	CAPACITOR
	C5	QCVB1CN-103	CAPACITOR
	C6	QCFA1HZ-103	CAPACITOR
	C7	QCFA1HZ-103	CAPACITOR
	C8	QCFA1HZ-103	CAPACITOR
	C9	QCSA1HJ-560	CAPACITOR
	C10	QCSA1HJ-680	CAPACITOR
	C11	QCSA1HJ-470	CAPACITOR
	C12	QCSA1HJ-470	CAPACITOR
	C13	QCFA1HZ-103	CAPACITOR
	C14	QCFA1HZ-103	CAPACITOR
	C15	QCFA1HZ-103	CAPACITOR
	C16	QCFA1HZ-103	CAPACITOR
	C17	QERS1HM-105	E CAPACITOR
	C18	QCFA1HZ-103	CAPACITOR
	C19	QERS1HM-105	E CAPACITOR
	C20	QCSA1HJ-101	CAPACITOR
	C21	QERS1HM-105	E CAPACITOR
	C22	QCFA1HZ-103	CAPACITOR
	C23	QCFA1HZ-103	CAPACITOR
	C24	QERS0JM-476	E CAPACITOR
	C25	QCFA1HZ-103	CAPACITOR
	C26	QCFA1HZ-103	CAPACITOR
	C27	QERS1HM-105	E CAPACITOR
	C28	QCFA1HZ-103	CAPACITOR
	C29	QERS0JM-476	E CAPACITOR
	C30	QERS1HM-104	E CAPACITOR
	C31	QCFA1HZ-103	CAPACITOR
	C32	QCFA1HZ-103	CAPACITOR
	C33	QCFA1HZ-103	CAPACITOR
	C34	QCSA1HJ-821	CAPACITOR
	C35	QRSA08J-0R0	RESISTOR
	C37	QCSA1HJ-121	CAPACITOR
	C38	QCSA1HJ-121	CAPACITOR
	C39	QCSA1HJ-331	CAPACITOR

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C40	QERS0JM-476	E CAPACITOR
	C41	QEE41EM-105	TANTAL CAPACITOR
	C42	QEE41EM-105	TANTAL CAPACITOR
	C43	QEE41EM-105	TANTAL CAPACITOR
	C44	QCFA1HZ-103	CAPACITOR
	C45	QCFA1HZ-103	CAPACITOR
	C46	QCFA1HZ-103	CAPACITOR
	C47	QCFA1HZ-103	CAPACITOR
	C48	QERS0JM-476	E CAPACITOR
	C49	QERS1CM-476	E CAPACITOR
	C50	QCFA1HZ-103	CAPACITOR
	C51	QFN41HJ-273	M CAPACITOR
	C52	QFN41HJ-103	M CAPACITOR
	C53	QERS1HM-105	E CAPACITOR
	C54	QCSA1HJ-470	CAPACITOR
	C55	QCFA1HZ-103	CAPACITOR
	C56	QCFA1HZ-103	CAPACITOR
	C57	QCSA1HJ-7R0	CAPACITOR
	C58	QCFA1HZ-103	CAPACITOR
	C59	QCSA1HJ-101	CAPACITOR
	C60	QCZ0208-104	MC CAP
	C61	PU60733-500	TRIMMER CAPACITOR
	C62	PU60733-500	TRIMMER CAPACITOR
	C63	PU60733-500	TRIMMER CAPACITOR
	C64	PU60733-500	TRIMMER CAPACITOR
	C101	QCFA1HZ-103	CAPACITOR
	C102	QCSA1HJ-680	CAPACITOR
	C110	QERS0JM-476	E CAPACITOR
	C111	QCFA1HZ-103	CAPACITOR
	C112	QCFA1HZ-103	CAPACITOR
	C113	QCSA1HJ-100	CAPACITOR
	C114	QCSA1HJ-360	CAPACITOR
	C115	QCSA1HJ-220	CAPACITOR
	C117	QCSA1HJ-180	CAPACITOR
	C118	QCFA1HZ-103	CAPACITOR
	C119	QCSA1HJ-470	CAPACITOR
	C121	QCFA1EZ-104	CAPACITOR
	L4	PU48530-101K	COIL
	L5	PU48530-101K	COIL
	L9	PU59152-330J	COIL
	L10	PU59152-181J	COIL
	L11	PU59152-4R7K	COIL
	L12	PU59152-270J	COIL
	L13	PU48530-101K	COIL
	L14	PU48530-101K	COIL
	L15	PU59152-120J	COIL
	L106	PU48530-101K	COIL
	L107	PU59152-820J	COIL
	L108	PU59152-390J	COIL
	L109	PU59152-220J	COIL
	L110	PU59152-220J	COIL
	L114	PU59152-330J	COIL
	BKT1	PQ42955	PWB BKT
	ETH1	PQ40433-2	EARTH LUG
	SCW1	DPSP2606Z	SCREW, X2
	SCW2	DPSP2606Z	SCREW
	SLD2	PU36485	SHIELD PLATE
	SLD3	PU36486	SHIELD CASE
	SPC1	WBS2600Z	TOOTH LOCK WASHER
	SPC2	PU59210-001	W. LOCKING SPACE, X5
	TP1	PU56008	TEST-PIN, X8
	CN1	PU56258-10	CAP HOUSING

REF NO.	PART NO.	PART NAME, DESCRIPTION
CN2	PU58844-3	CAP HOUSING
CN3	PU58844-3R	CAP HOUSING
CN4	PU58844-5R	CAP HOUSING
CN5	PU58844-5Y	CAP HOUSING
CN6	PU58844-4	CAP HOUSING
CN7	PU58844-5	CAP HOUSING
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*****		
* 16. DECK TERMINAL BOARD ASSY <51> *		
*****		
PWBA	PB20013D-02	DECK TERMINAL BOARD ASSY
PWBA1	PB20013C1	DECK TERMINAL BOARD ASSY
R1	QRD181J-151	RESISTOR
R3	QRD181J-331	RESISTOR
PS1	PU60271	PHOTO INTERRUPTER
CN1	PEMC0722-017	WIRE TRAP
	OR PEMC0753-017	WIRE TRAP
*****		
*****		
* 17. RELAY BOARD ASSY <52> *		
*****		
PWBA2	PB20013C2-02	RELAY BOARD ASSY
C1	QCC11EJ-104	CAPACITOR
LC1	PU59736-471	N FILTER
LC2	PU59736-471	N FILTER
K1	PU60281-5	FERRITE BEADS
WR1	PW30113-GOABZ62	PARALLEL WIRE
	OR PW30118-GOABZ62	PARALLEL WIRE
*****		
*****		
* 18. REC SAFETY BOARD ASSY <53> *		
*****		
PWBA3	PB20013A3	REC SAFETY BOARD ASSY
S1	PU58644-1-3	REC SAFETY SWITCH
*****		
*****		
* 19. END SENSOR BOARD ASSY <54> *		
*****		
PWBA4	PB20013A4	END SENSOR BOARD ASSY
Q1	PN268R-NC	PHOTO TRANSISTOR
HO1	PQ31047-1-4	END SENSOR HOLDER
CN1	PU59945-102	WIRE SOCKET



#△	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C4	QER61CM-106	E CAPACITOR
	C5	QER41AM-107	E CAPACITOR
	C6	PU57672-400	TRIMM.C,TIME DATE POS ADJ
	C7	QER61CM-476	E CAPACITOR
	C8	QCVB1CM-103	CAPACITOR
	L1	PU59152-101J	COIL
	L2	PU59152-100J	COIL
△	CF1	PU59576	RESONATOR
	SCW1	SDSP2606Z	SCREW, X2
	SCW2	SDSP2604M	SCREW, X2
	SKT1	PGZ01001	IC SOCKET, (FOR IC1)
		PU44398	FUSE SOCKET, X2
	SPC1	PRD43011	SHEET
	TP1	PU54983	TEST PIN, X5
	CN1	PU58844-7	CAP HOUSING
	CN2	PU58844-8Y	CAP HOUSING
	CN3	PU58844-3R	CAP HOUSING

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\* 22. ON SCREEN DATE/BATTERY BOARD(2) ASSY <\*  
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PWBA2	PGE20315A2-01	ON SCREEN/BATTERY BOARD(2) ASSY
IC101	MB89010A-108	IC
IC102	BU4013B	IC
OR	TC4013BP	IC
IC103	M52684AP	IC
Q101	2SA1309R,S	TRANSISTOR
Q102	DTC114EF	TRANSISTOR
R101	QRD161J-472	RESISTOR
R102	QRD161J-102	RESISTOR
R103	QRD161J-102	RESISTOR
R104	QRD161J-102	RESISTOR
R105	QRD161J-102	RESISTOR
R106	QRD161J-472	RESISTOR
R107	QRD161J-222	RESISTOR
R108	QRD161J-681	RESISTOR
R109	QRD161J-222	RESISTOR
R110	QRD161J-103	RESISTOR
R111	QRD161J-102	RESISTOR
R112	QRD161J-471	RESISTOR
R113	QRD161J-182	RESISTOR
R114	QRD161J-154	RESISTOR
R115	QRD161J-271	RESISTOR
R116	QRD161J-152	RESISTOR
R117	QRD161J-103	RESISTOR
R118	QRD161J-103	RESISTOR
C101	QER61CM-476	E CAPACITOR
C102	QCVB1CM-103	CAPACITOR
C103	PU57601-335MC	E CAPACITOR
C104	QCVB1CM-103	CAPACITOR
C105	QCSB1HJ-150	CAPACITOR
C106	QCSB1HJ-330	CAPACITOR
C107	QER61HM-335GZ	E CAPACITOR
C108	QCSB1HJ-101	CAPACITOR
C109	QER61CM-106	E CAPACITOR
C110	QCVB1CM-103	CAPACITOR

#△	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C111	QCXB1CM-152	CAPACITOR
	C112	QCSB1HJ-220	CAPACITOR
	C113	QCVB1CM-103	CAPACITOR
	C114	QCVB1CM-103	CAPACITOR
	C115	QFN31HJ-222	M CAPACITOR
	C116	QER61HM-105	E CAPACITOR
	L101	PU58333-180K	COIL
	L102	PU59152-100J	COIL
△	CF101	PU60086	CERAMIC FILTER
	TP101	PU56008	TEST-PIN
	CN101	PGZ01081-09	MICRO HEADER
	CN102	PGZ01081-03	CAP HOUSING
	CN103	PGZ01081-03	CAP HOUSING

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\* 23. REAR BOARD ASSY <76>  
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PWBA	PGE20331A-02	REAR BOARD ASSY
D201	RD5.1EB	ZENER DIODE
D203	RD5.1EB	ZENER DIODE
R201	QRD167J-750	RESISTOR
RA201	QRB087J-103	RESISTOR ARRAY
OR	QRB089J-103	RESISTOR ARRAY
C202	QCF31HP-223	CAPACITOR
C203	QCF31HP-103	CAPACITOR
S201	PGZ00469-02	SLIDE SWITCH
S202	QSS1K81-L01	DIP SWITCH
TB1	PGZ01267-03	TERMINAL BOAD
△ VA201	PU49624-2	VARISTOR
△ VA203	PU49624-2	VARISTOR
CN201	PU59513-4	CAP HOUSING
CN202	PU59513-4R	CAP HOUSING
CN203	PU58844-102	CAP HOUSING
CN204	PU58844-110	CAP HOUSING
CN205	PU58844-105	CAP HOUSING

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\* 24. DISPLAY BOARD ASSY <77>  
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PWBA	PGE20314A	DISPLAY BOARD ASSY
IC1	MSC7112-01SS	IC
IC2	M50253P	IC
Q1	DTC144EF	TRANSISTOR
Q2	DTC144EF	TRANSISTOR
D1	RD7.5EB2	ZENER DIODE
D2	1SS132	DIODE
D3	1SS132	DIODE
D4	SEL1320G	LE DIODE
D5	SLB-55VR3F	LE DIODE

#A	REF NO.	PART NO.	PART NAME, DESCRIPTION
	D6	1SS133	DIODE
	R1	QRD167J-102	RESISTOR
	R2	QRD167J-102	RESISTOR
	R3	QRD167J-102	RESISTOR
	R4	QRD167J-273	RESISTOR
	R5	QRD167J-103	RESISTOR
	R6	QRD167J-221	RESISTOR
	R7	QRD167J-331	RESISTOR
	R8	QRD167J-472	RESISTOR
	R9	QRD167J-472	RESISTOR
	R10	QRD167J-472	RESISTOR
	R11	QRD167J-223	RESISTOR
	R12	QRD167J-472	RESISTOR
	RA1	QRB037J-222	RESISTOR ARRAY
	C1	QCBB1HJ-101	CAPACITOR
	C2	QER61HM-104	E CAPACITOR
	C3	QCF11HP-223	CAPACITOR
	C4	QER60JM-336	E CAPACITOR
	C5	QCS31HJ-560	CAPACITOR
	C6	QCF11HP-473	CAPACITOR
	C7	QCS31HJ-560	CAPACITOR
	C8	QCS31HJ-560	CAPACITOR
	C9	QCS31HJ-680	CAPACITOR
	C10	QCS31HJ-680	CAPACITOR
	FDP1	PGZ01390	FLUORESCENT DISPLAY PANEL
A	TH1	PUS2108-100K	POSITIVE THERMISTOR
	CL1	PU59311-2	WIRE CLAMP
	HD1	PRD41673	LED HOLDER
	HD2	PQ40113-1-1	LED HOLDER
	HD3	PQ31309	FDP HOLDER(L)
	HD4	PQ31310	FDP HOLDER(R)
	SPC1	PRD30030-33	PAD
	SPC2	PRD42546	DISPLAY SHEET
	SPC3	PRD30030-15	PAD
	WR1	PGW0202-080060	PARALLEL WIRE
	CN1	PGZ01070-06	CAP HOUSING
	CN2	PU58844-103	CAP HOUSING
	CN3	PU58844-102	CAP HOUSING
	CN4	PU59513-12	CAP HOUSING
	CN5	PU58844-105	CAP HOUSING

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 \* 25. CLEANER BOARD ASSY <78> \*  
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PWBA	PGE20264B	CLEANER BOARD ASSY
IC1	TC4011UBP	IC
IC2	TC4040BP	IC
IC3	TC4069UBP	IC
IC4	BA222	IC
Q1	2SD973R	TRANSISTOR
D1	1SS133	DIODE
D2	1SS133	DIODE
D4	1SS133	DIODE
D7	1SS133	DIODE
D8	1SS133	DIODE

#A	REF NO.	PART NO.	PART NAME, DESCRIPTION
	D9	1SS133	DIODE
	D10	1SS133	DIODE
	D11	1SS133	DIODE
	D12	V03C	DIODE
	D13	1SS133	DIODE
	R1	QRD167J-103	RESISTOR
	R2	QRD167J-104	RESISTOR
	R3	QRD167J-103	RESISTOR
	R4	QRD167J-104	RESISTOR
	R5	QRD167J-333	RESISTOR
	R6	QRD167J-333	RESISTOR
	R7	QVZ3507-104	V RESISTOR
	R8	QRD167J-224	RESISTOR
	R9	QRD167J-102	RESISTOR
	R10	QRD167J-473	RESISTOR
	R11	QRD167J-104	RESISTOR
	R12	QRD167J-563	RESISTOR
	C1	QER41CM-476	E CAPACITOR
	C2	QFN41HJ-102	M CAPACITOR
	C3	QFN41HJ-102	M CAPACITOR
	C4	QER41CM-476	E CAPACITOR
	C5	QFN41HK-103	M CAPACITOR
	C6	QFN41HK-103	M CAPACITOR
	C7	QFN41HK-103	M CAPACITOR
	C8	QER41EM-335	E CAPACITOR
	C9	QCS11HJ-221	CAPACITOR
	C10	QER41HM-474	E CAPACITOR
	C11	QCC11EJ-223	CAPACITOR
	L1	PU48530-181J	COIL
	CN1	PU58844-109	CAP HOUSING
	CN2	PU58844-102Y	CAP HOUSING

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 \* 26. TIMER BOARD ASSY <79> \*  
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PWBA	PRK20051A	TIMER BOARD ASSY
IC1	UPD75216ACW-B05	IC
IC2	M5278L56	IC
IC3	IC-PST523H-2	IC
IC4	IC-PST523H-2	IC
Q1	2SC3311A(RS)	TRANSISTOR
D1	RD9.1ES-T1B2	ZENER DIODE
D2	1SS133	DIODE
D3	1SS133	DIODE
D4	RD8.2ES-T1B2	ZENER DIODE
D5	1SS133	DIODE
D6	1SS133	DIODE
D7	RD7.5ES-T1B1	ZENER DIODE
D8	1SS133	DIODE
D9	LTZ-MR15	DIODE
D10	1SS133	DIODE
D11	1SS133	DIODE
D12	1SS133	DIODE
D13	1SS133	DIODE
D14	1SS133	DIODE
R1	QRD161J-472	RESISTOR
R2	QRD161J-682	RESISTOR

#△ REF NO. PART NO. PART NAME, DESCRIPTION

R3 QRD161J-104 RESISTOR  
R4 QRD161J-471 RESISTOR  
R5 QRD161J-102 RESISTOR  
R6 QRD161J-333 RESISTOR  
R7 QRD161J-102 RESISTOR  
R8 QRD161J-224 RESISTOR  
R9 QRD161J-473 RESISTOR  
R10 QRD161J-102 RESISTOR

R11 QRD161J-123 RESISTOR  
R12 QRD161J-223 RESISTOR  
R13 QRD161J-0R0 RESISTOR  
R14 QRD161J-223 RESISTOR  
R16 QRD161J-472 RESISTOR  
R17 QRD161J-472 RESISTOR  
R18 QRD161J-472 RESISTOR  
R19 QRD161J-472 RESISTOR  
R20 QRD161J-103 RESISTOR

R21 QRD161J-103 RESISTOR  
R22 QRD161J-103 RESISTOR  
R23 QRD161J-103 RESISTOR  
R24 QRD161J-103 RESISTOR  
R25 QRD161J-103 RESISTOR  
R26 QRD161J-103 RESISTOR  
R27 QRD161J-103 RESISTOR  
R28 QRD161J-103 RESISTOR  
R29 QRD161J-103 RESISTOR  
R30 QRD161J-103 RESISTOR

R31 QRD161J-103 RESISTOR  
R32 QRD161J-102 RESISTOR  
R33 QRD161J-104 RESISTOR  
R34 QRD161J-104 RESISTOR  
R35 QRD161J-102 RESISTOR  
R36 QRD161J-102 RESISTOR  
R37 QRD161J-103 RESISTOR  
R38 QRD161J-103 RESISTOR  
R39 QRD161J-103 RESISTOR  
R40 QRD161J-103 RESISTOR

R41 QRD161J-334 RESISTOR  
R42 QRD161J-102 RESISTOR  
R43 QRD161J-103 RESISTOR  
R44 QRD161J-103 RESISTOR  
R45 QRD161J-102 RESISTOR  
R46 QRD161J-104 RESISTOR  
R47 QRD161J-472 RESISTOR  
R48 QRD161J-472 RESISTOR  
R49 QRD161J-472 RESISTOR  
R50 QRD161J-472 RESISTOR

R51 QRD161J-472 RESISTOR  
R52 QRD161J-223 RESISTOR  
R53 QRD161J-223 RESISTOR  
R54 QRD161J-104 RESISTOR  
R55 QRD161J-103 RESISTOR  
R56 QRD161J-104 RESISTOR  
R57 QRD161J-104 RESISTOR  
R59 QRD161J-103 RESISTOR

R62 QRD161J-0R0 RESISTOR

RA1 QRB067J-104 NETWORK RESISTOR  
OR QRB069J-104 NETWORK RESISTOR  
RA2 QRB077J-104 NETWORK RESISTOR  
OR QRB079J-104 NETWORK RESISTOR

C1 QETC1CM-336 E CAPACITOR  
C2 QETC1CM-336 E CAPACITOR  
C3 QEA40HZ-104 E CAPACITOR  
C4 QCF31HP-102 CAPACITOR  
C5 QETC1CM-106 E CAPACITOR  
C6 QCF31HP-103 CAPACITOR

#△ REF NO. PART NO. PART NAME, DESCRIPTION

C7 QCF31HP-103 CAPACITOR  
C9 QETC1HM-225 E CAPACITOR  
C10 QEK61HM-336 E CAPACITOR

C11 QCT30CH-120 CAPACITOR  
C12 QAT3661-200 TRIMMER CAPACITOR,CLOCK ADJ  
C13 QCS31HJ-330 CAPACITOR  
C14 QCS31HJ-330 CAPACITOR  
C15 QETC1CM-476 E CAPACITOR  
C16 QCF31HP-473 CAPACITOR  
C17 QETA1AM-477 E CAPACITOR  
C18 QETC1HM-105 E CAPACITOR

△ X1 PU60226-4 CRYSTAL RESONATOR  
△ X2 PU58394 CRYSTAL RESONATOR

△ RY1 PU55260 RELAY

△ TH1 PU52108-100K POSITIVE THERMISTOR  
△ TH2 PU52108-100K POSITIVE THERMISTOR

SKT1 PGZ01001 IC SOCKET,(FOR IC1)

SPC1 PU59210-001 W.LOCKING SPACE, X2

TP1 PU54983 TEST PIN, X5

CN1 PGZ01298-16 CAP HOUSING  
CN2 PU58844-8Y CAP HOUSING  
CN3 PGZ01298-06 CAP HOUSING  
CN4 PU58844-7 CAP HOUSING  
CN5 PU58844-9R CAP HOUSING

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\* 27. OPERATION 1 BOARD ASSY <92> \*  
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PWBA PGE10139A OPERATION BOARD ASSY

PWBA1 PGE10139A1 OPERATION 1 BOARD ASSY

IC1 LA7225 IC

Q1 2SA1309R,S TRANSISTOR

D1 SLR-55VC3F LE DIODE

R1 QRD161J-223 RESISTOR  
R2 QRD161J-104 RESISTOR  
R3 QRD161J-120 RESISTOR  
R4 QRD161J-152 RESISTOR  
R6 QRD161J-102 RESISTOR  
R7 QRD161J-104 RESISTOR  
R8 QRD161J-102 RESISTOR  
R9 QRD161J-222 RESISTOR  
R10 QRD161J-223 RESISTOR

R11 QRD161J-331 RESISTOR  
R12 QRD161J-222 RESISTOR  
R13 QRD161J-222 RESISTOR  
R14 QRD161J-332 RESISTOR  
R15 QRD161J-472 RESISTOR  
R16 QRD161J-103 RESISTOR  
R17 QRD161J-222 RESISTOR  
R18 QRD161J-222 RESISTOR  
R19 QRD161J-183 RESISTOR  
R20 QRD161J-823 RESISTOR

R21 QRD161J-104 RESISTOR  
R22 QRD161J-103 RESISTOR

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
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R23	QVZ3507-474	V RESISTOR,V.LOCK
R24	PGZ01302	V RESISTOR,T.D BRIGHT
R25	PGZ00688	V RESISTOR,P.SHARP
R26	QRD161J-101	RESISTOR
R27	QRD161J-101	RESISTOR

C1	QER61EM-475	E CAPACITOR
C2	QFJ41HJ-273	M CAPACITOR
C3	QER61HM-225	E CAPACITOR
C4	QER61AM-476	E CAPACITOR
C5	QER60JM-476	E CAPACITOR
C6	QCB81HJ-471	CAPACITOR

L1	PU59060	TRAP COIL
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S1	PGZ01303	KEY LOCK SWITCH
S2	PU57551	TACT SWITCH
S3	PU57551	TACT SWITCH
S4	PU57551	TACT SWITCH
S5	PU57551	TACT SWITCH
S6	PU57551	TACT SWITCH
S7	PU57551	TACT SWITCH
S8	PGZ01092	PUSH SWITCH
S9	PU57551	TACT SWITCH
S10	PU57551	TACT SWITCH

S11	PU57551	TACT SWITCH
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CL1	PU59311-2	WIRE CLAMP, X3
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JA1	PGZ00409	PIN JACK
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SPC1	PU50634-2	LED SPACER
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CN1	PU58844-6	CAP HOUSING
CN2	PU58844-3	CAP HOUSING
CN3	PU58844-2	CAP HOUSING
CN4	PU58844-5	CAP HOUSING
CN5	PU58844-10	CAP HOUSING

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 \* 28. OPERATION 2 BOARD ASSY <93> \*  
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PWBA2	PGE10139A2	OPERATION 2 BOARD ASSY
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Q101	DTA114EF	TRANSISTOR
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D101	SLR-55VC3F	LE DIODE
D102	SLR-55VC3F	LE DIODE
D103	SLR-55VC3F	LE DIODE
D104	SLR-55VC3F	LE DIODE
D105	SLR-55VC3F	LE DIODE
D106	SLR-55VC3F	LE DIODE
D107	SLR-55VC3F	LE DIODE
D108	1SS133	DIODE

R101	QRD161J-331	RESISTOR
R102	QRD161J-331	RESISTOR
R103	QRD161J-331	RESISTOR
R104	QRD161J-331	RESISTOR
R105	QRD161J-331	RESISTOR
R106	QRD161J-331	RESISTOR
R107	QRD161J-331	RESISTOR
R108	QRD161J-102	RESISTOR

S101	PU58486-1-1	SLIDE SWITCH
S102	PU58486-1-1	SLIDE SWITCH
S103	PU58486-1-1	SLIDE SWITCH
S104	PU58486-1-1	SLIDE SWITCH

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
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S105	PU58486-1-1	SLIDE SWITCH
S106	PU58488-1-1	SLIDE SWITCH
S107	PU57551	TACT SWITCH
S108	PU57551	TACT SWITCH

S111	PU57551	TACT SWITCH
S112	PU57551	TACT SWITCH
S113	PU57551	TACT SWITCH
S115	PU57551	TACT SWITCH
S116	PU57551	TACT SWITCH
S117	PU57551	TACT SWITCH
S118	PU57551	TACT SWITCH

S121	PU57551	TACT SWITCH
S122	PU57551	TACT SWITCH
S123	PU57551	TACT SWITCH
S124	PU57551	TACT SWITCH
S125	PU57551	TACT SWITCH
S126	PU57551	TACT SWITCH

CL1	PU59311-2	WIRE CLAMP
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COL1	PRD30026-35	COLLAR
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HD1	PGZ01031-02	P C SUPPORT, X3
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SCW1	SPSP3012Z	SCREW
SCW2	SBST3006Z	SCREW, X3

SPC1	PU50634-2	LED SPACER, X7
	PQM30017-4	SLIT WASHER

WR1	PGW0202-080160	PARALLEL WIRE
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J101	QWE251-16A2A2	WIRE
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CN101	PU58844-10	CAP HOUSING
CN102	PU58844-12	CAP HOUSING
CN103	PU58844-6	CAP HOUSING
CN104	PU58844-3	CAP HOUSING
CN105	PGZ01070-16	CAP HOUSING